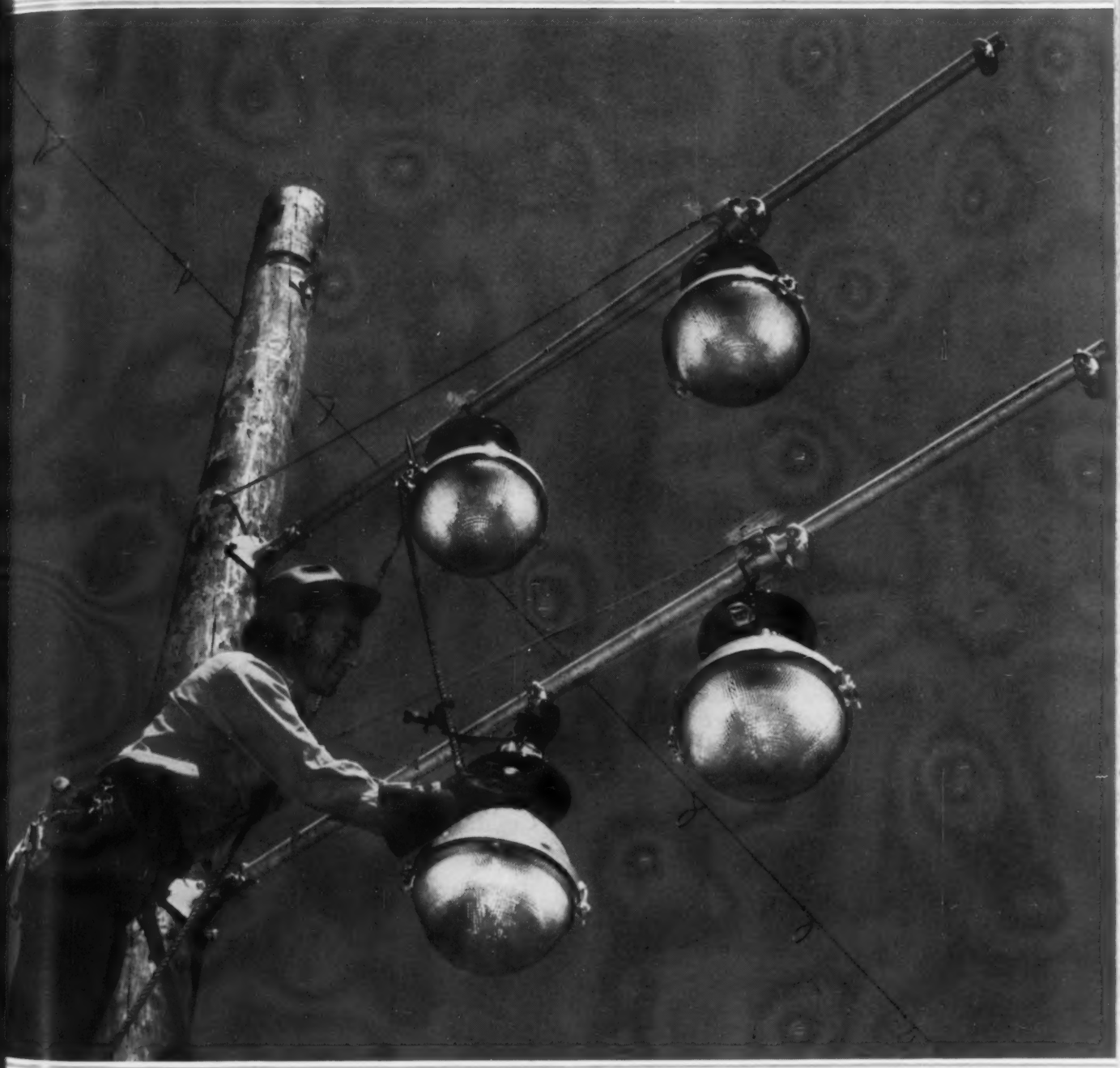
LECTRICAL
EST

September 1947
25 cents



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Appliances, Page 96

KESMAN FOR THE MOST HIGHLY ELECTRIFIED REGION OF THE U. S.

ELECTRIC COOKING
HAS EVERYTHING
Automatic Declare your own independence from drudgery with an *electric* range! Just set the automatic clock controls and let the range take over pot-watching and baking. Cooking *electrically* is so downright *easy*!
Cool Cooking's a lark the cool *electric* way! Your kitchen can be the coolest room in your home . . . modern insulation and scientific design keep *all* the heat inside the oven and under the pans!
Economical It's penny-wise and pounds of fun . . . to cook on an *electric* range! Every day is "bargain day" when you cook *electrically*! Your Edison rates are already low — the lowest in history — but when you install an *electric* range they will be even lower!
NEW Electric RANGES ARE NOW IN STOCK
No more waiting for *your* streamlined new *electric* range! Your favorite dealer has just the right model for your kitchen on display!
Now you can enjoy all the fun and freedom which goes with owning one of these exciting postwar models! Immediate installation can be arranged!
Edison
DEALER'S CHOICE!
ADVERTISING THAT HELPS
SELL APPLIANCES

Behind every dealer in electrical equipment, is a helping hand . . . Edison newspaper advertisements like these, to assist in the sale of appliances.

Now that electric ranges are available in quantity, advertising for the past few months has tied in with dealer displays to sell the advantages of elctrical cooking.

Deal yourself a larger share of sales by keying your own promotion to Edison's business building campaigns.

Edison **SOUTHERN CALIFORNIA EDISON COMPANY**

The First HYDRO UNIT POWER PLANT

WILL GO INTO OPERATION THIS FALL

A hydro unit power plant — to be installed in New England — introduces the newest G-E development in the field of completely factory-fabricated unit equipment. The plant will include complete electric equipment from the generator coupling to the transmission line, all fully co-ordinated mechanically and electrically — designed, built and installed as a *unit*.

The G-E hydro unit power plant brings to power generation a more complete co-ordination of modern, metal-enclosed station equipment, gives extra assurance of power continuity and safety. And with it come these inherent economies that many operators cannot afford to overlook.

- ★ **Savings in detailed engineering and drafting**—You avoid the long, costly job of individually selecting and co-ordinating all plant components.
- ★ **Savings in purchasing**—General Electric submits one complete set of specifications for all plant electric equipment.
- ★ **Savings in installation**—The unit plant is less expensive to install. One purchaser states that installation costs are only a third of those of installing the equivalent piecemeal equipment.
- ★ **Savings in operation**—Co-ordinated protective equipment—offered as an integral part of the hydro unit plant—permits unattended operation after starting, or remote control operation.

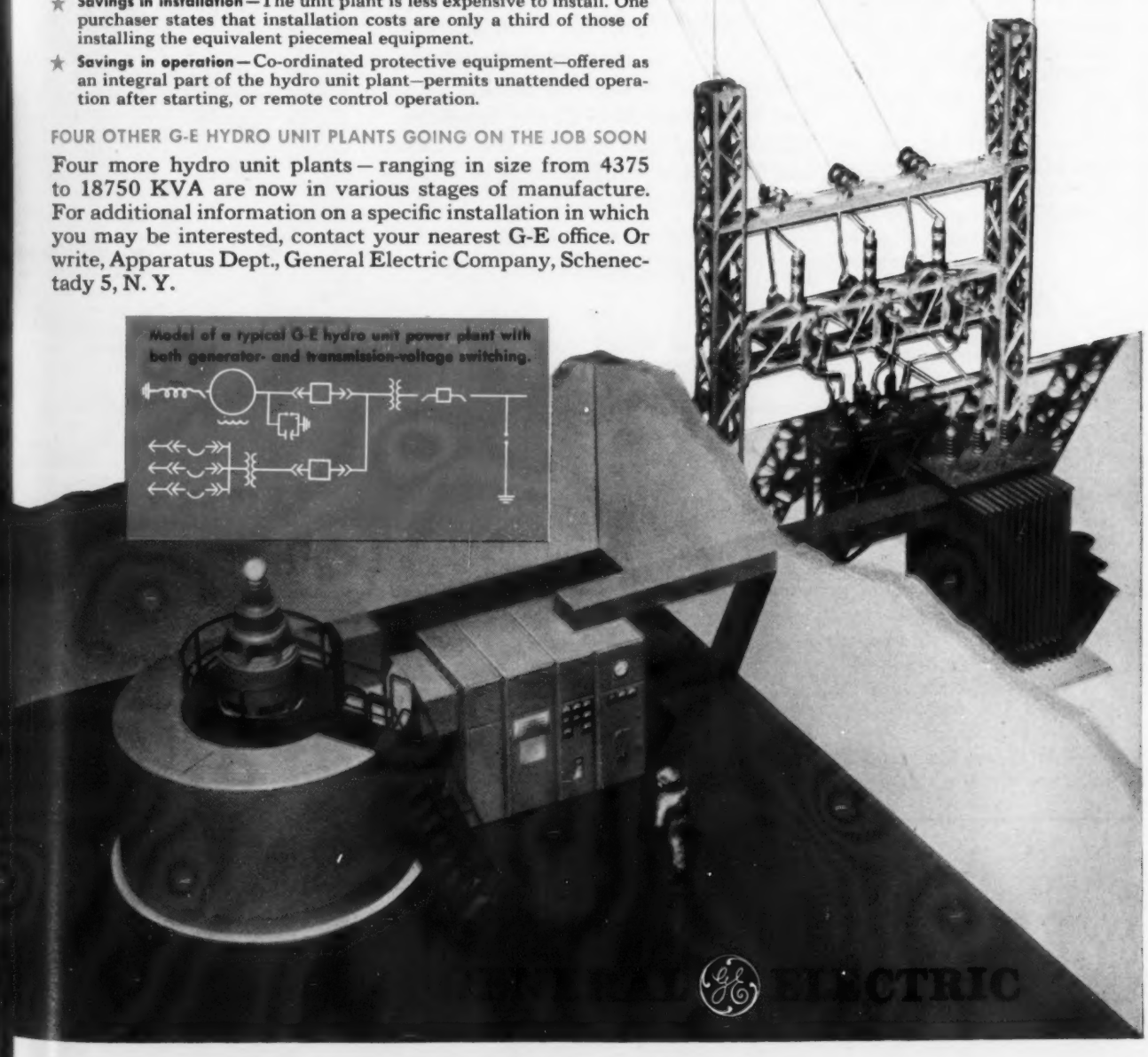
FOUR OTHER G-E HYDRO UNIT PLANTS GOING ON THE JOB SOON

Four more hydro unit plants — ranging in size from 4375 to 18750 KVA are now in various stages of manufacture. For additional information on a specific installation in which you may be interested, contact your nearest G-E office. Or write, Apparatus Dept., General Electric Company, Schenectady 5, N. Y.

A G-E hydro unit power plant includes the exact combination of electric equipment needed for the specific installation.

GENERATOR • NEUTRAL GROUNDING REACTOR
POWER TRANSFORMER • OUTDOOR STATION
WIRING DIAGRAMS • INSTRUCTION BOOKS
PROTECTIVE RELAYING • SURGE PROTECTION
AUTOMATIC CONTROL • VOLTAGE REGULATOR
SWITCHGEAR • STATION SERVICE • BUS RUNS
INSTALLATION DRAWINGS

Model of a typical G-E hydro unit power plant with both generator- and transmission-voltage switching.



GENERAL ELECTRIC

SEPTEMBER
1947

SPOKESMAN FOR MOST HIGHLY ELECTRIFIED REGION OF THE U. S.
The all-industry magazine of progress, established 1887, and incorporating the "Electrical Journal", "Journal of Electricity, Power and Gas" and "Journal of Electricity". Contents Copyright. Sixtieth year of publication.

ELECTRICAL WEST

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NEXT MONTH

Once a year we take a look at the entire industrial development in the West in order to index for you the significant directions and promises that the picture affords. Never a mere optimistic promotional preview, we endeavor to be realistic and factual. That the picture is rosy is a welcome by-product, of course. Highlighting next month's industrial array of such articles will be one bringing forth the importance of the frozen food industry to us all. It runs the gamut from the irrigation pump in the field clear through to the home freezer and everyone has a stake in it.

Two important conventions will have taken place—the AIEE at San Diego, and the NECA in San Francisco. A clearcut digest of what both mean to the industry will be presented, of course. An important new league in the Inland Empire region will also be analyzed — for its work is doing things to the market which reach back to affect us all.

Some of the excellent lighting trends that could not be included in this number for lack of space will be given a chance. The interesting 440-volt job at Moffatt Field, promised last month, is one of them. . . .

What enterprising dealers are doing in various parts of the West will be shown in pictures. The Sales Guide will hint how to sell electric blankets. In fact the issue will be full of useful material.

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Cover photo: Installing Portland's street lighting laboratory.

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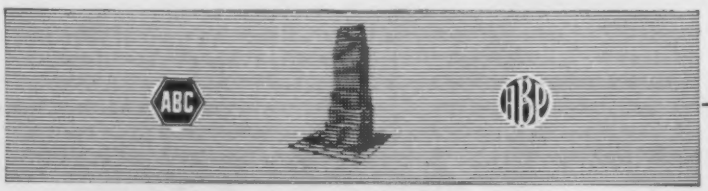

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VOL. 99
NO. 3

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How L-M Research ON GALVANIZING HELPS CUT CORROSION ON POLE LINE HARDWARE

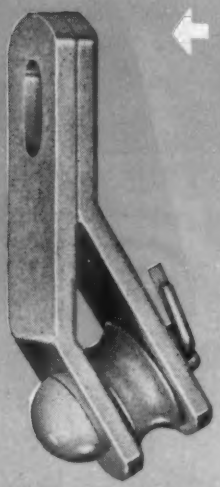
Through careful laboratory work, extensive tests in the field, and based on 30 years of practical experience in galvanizing, Line Material engineers developed a uniform, closely controlled method of hot-dip galvanizing that amply meets E.E.I. specifications and insures the longest possible resistance to corrosion.

The L-M method includes complete specifications for steel, zinc, and other raw materials; for cleaning, pickling, and dipping; and for inspection all along the line. The result is a close alloy bond between zinc and steel; a clean, uniform coating, free from thin spots, pinholes, or embrittlement.

L-M galvanized hardware and specialties usually cost no more; but the long resistance against corrosion makes them preferred products. They're worth investigating.

• • •

Left: Machine and forged eye bolts showing the uniform ductile zinc coating, smooth surface, clean threads. Pages 8-006 and 8-007 in your Line Material catalog.

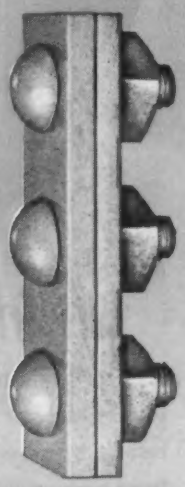


L-M Angle Roller Dead End Fitting
Cat. Page 6-056; No. A-260001

Grooved roller turns freely, eliminates friction and wear on guy wire, lengthens life of the installation. Also available in combination fitting with horizontal roller above angle roller. Welded straps. An L-M specialty, fully galvanized for corrosion resistance.

L-M Guy Clamp
Cat. Page 8-016; No. 9493

Pretty much like every steel clamp except that L-M hot-dip galvanizing is closely controlled to assure longest protection against corrosion. Light or heavy weights; one to four bolts; up to 8" long; up to 2⅛" wide. Square holes in both plates permit inverting the square-shank bolts.



LINE MATERIAL
POLE LINE HARDWARE

L-M DISTRIBUTION EQUIPMENT INCLUDES: Distribution Transformers • Fuse Cutouts and Fuse Links • Lightning Arresters • Oil Switches • Pole Line Hardware • Line Construction Specialties • Underground Equipment • Fibre Conduit • Street and Airport Lighting Equipment • Wired Radio Control Equipment • Capacitors

QUESTION BOX ON CABLE SHEATH IMPROVEMENTS

Q. What new cable development increases manhole fatigue resistance and eliminates corrosion?

A. Okometal plus Okosheath Protective Covering – a composite sheath just introduced by Okonite-Callender engineers.

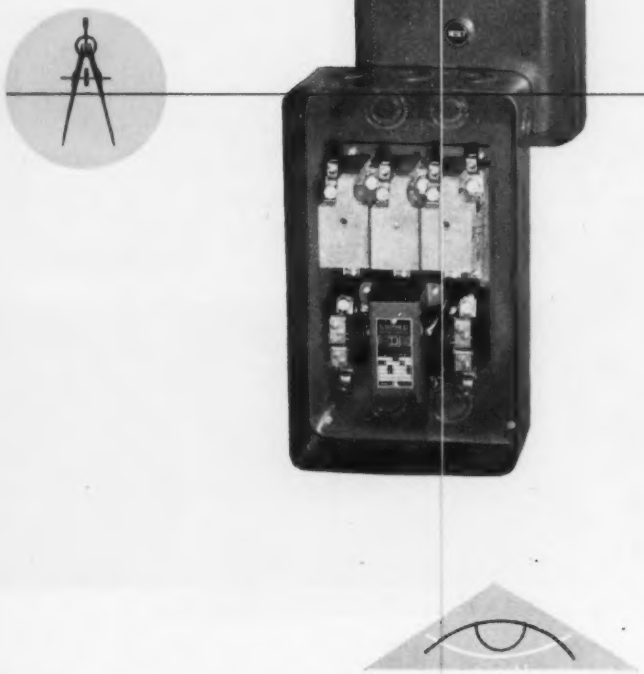
Q. Where may I get the full details?

A. From The Okonite-Callender Cable Company, Inc., Passaic, New Jersey. (Ask for new bulletin OK-1034)

this booklet gives all the answers

... told thoroughly along with photographs, diagrams, tables of test data giving results of physical tests and comparative bend tests on sheaths, comparative manhole bend and bursting strength tests, internal pressure tests and AIEC tests.

OKONITE-CALLENDER paper insulated power cables



DESIGNED FOR EASY MAINTENANCE

QUICK INSPECTION

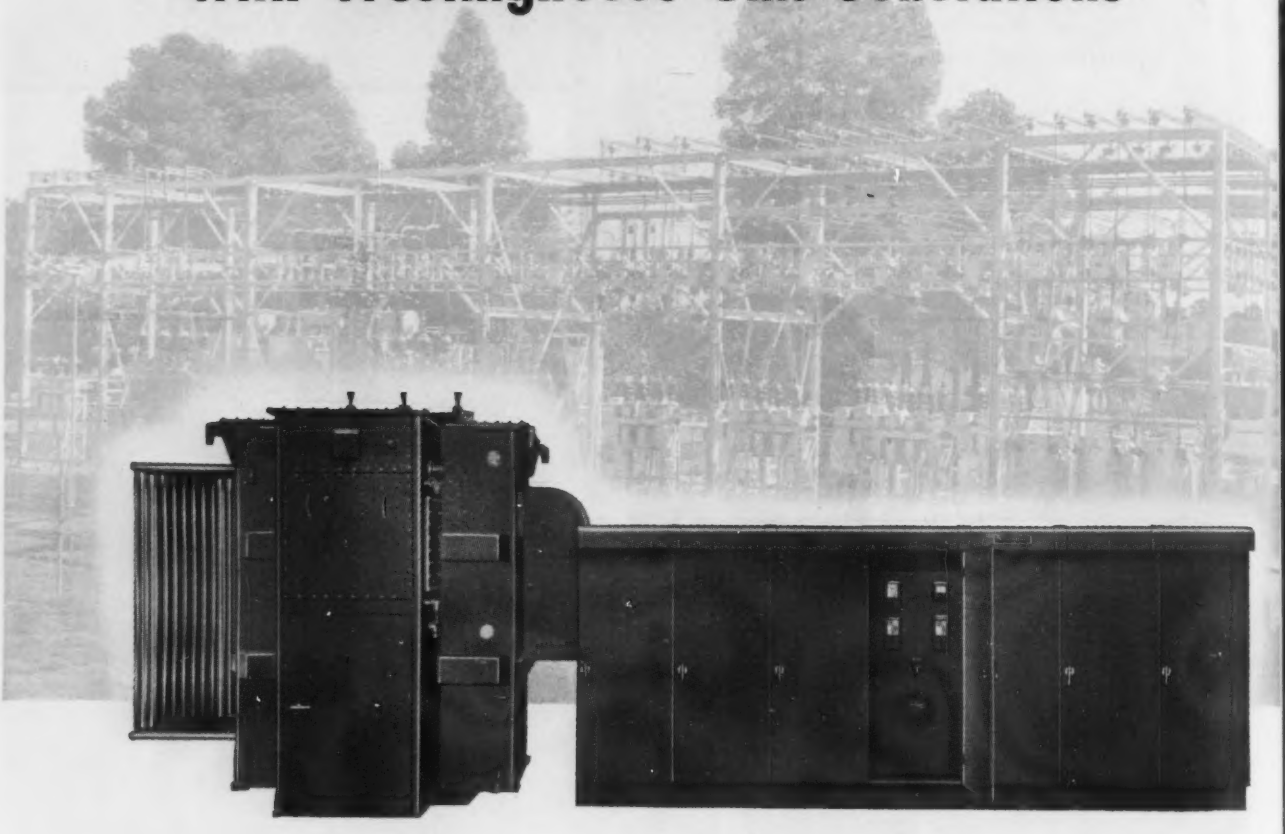
SQUARE D STARTERS...

. . . are designed compactly
and provide maximum wiring space.
. . . are built to stand up
under the most trying conditions.
. . . are designed to provide
maximum ease of maintenance
with the use of minimum tools.
current carrying parts are mounted
towards the front of the enclosure
and hinged movable structure
provides ease of inspection.
there is a Square D Starter
for every application . . . for more information
contact a Square D field engineer.

SQUARE D COMPANY

LOS ANGELES · DETROIT · MILWAUKEE

POWER DISTRIBUTION ECONOMICS
with Westinghouse Unit Substations



ACCESSIBILITY
COMPACTNESS } **Low Cost Maintenance = LOWER DISTRIBUTION COSTS**

Low-cost maintenance and operating safety are important requirements fully met by Westinghouse Unit Substations. Doors and easily removable barriers permit ready access to all the equipment requiring inspection and maintenance. Operating safety is provided through carefully designed system barriers and interlocks.

Co-ordinated design plus "Unitized" switchgear units simplify increasing station capacity. Compactness with adequate accessibility means . . . lower real estate costs . . . pleasing appearance . . . ease in inspection and maintenance. Super-structure and overhead circuits are kept to a minimum . . . thus further reducing maintenance and inspection time.

Whether you are planning an expansion or reconversion, Westinghouse power distribution engineers are ready to help you. Call your nearest Westinghouse office or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania.

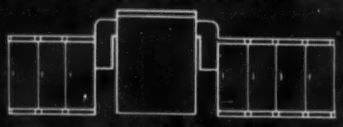
J-97129

ADD UP THESE *Advantages*

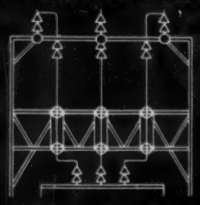
YOUR ANSWERS TO BETTER DISTRIBUTION PLANNING

1. **Lower maintenance cost . . .** upkeep time and costs are reduced as compared to the open, structural-type substation.
2. **Modern . . . pleasing appearance.**
3. **Compact . . . saves space.**
4. **Minimum installation time and cost.**
5. **Improved Service Continuity.**
6. **Undivided Responsibility . . .** complete electrical and mechanical co-ordination.

INCOMING LINE FACILITIES TO MEET EVERY REQUIREMENT...

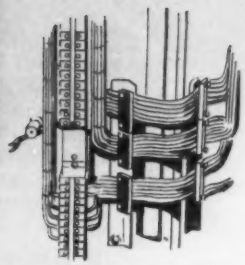


—When required Unit Substations can be supplied with coordinated, metal clad, "Unitized" switchgear for incoming power supplies of 13,800 volts and below.



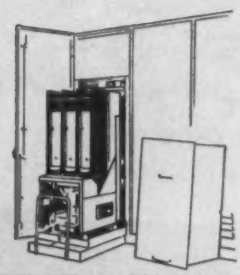
—Prefabricated overhead incoming line structures.

—Transformer mounted terminal chambers or switches for use with underground cables.

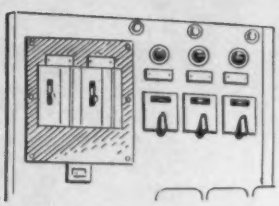


STANDARD WIRING makes it easier to trace circuits. Note how wires crossing from panel to stationary door are braced to prevent excessive wear.

INERTAIRE EQUIPMENT maintains a *nitrogen* atmosphere above transformer liquid at all times forming an inert gas "cushion"—prevents oil deterioration.



BREAKER IS REMOVABLE, in minutes — with full safety to operator because each movement follows an interlock-protected sequence.



LOADING-BY-COPPER TEMPERATURE RELAY—makes more overload transformer capacity safely available—guards transformer winding at all times.

Westinghouse

PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

UNIT SUBSTATIONS FOR ANY SYSTEM

Leader

opens a NEW door to better lighting

. . . with a competent staff of illumination engineers to serve you

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John O. Garrett
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Alvarado Hotel
Albuquerque, N. Mex.
Hastings Richards

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Dayton, Ohio

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Detroit 2, Mich.

S. T. Schoolar & Co.
5 Shockoe Slip
Richmond, Va.
Lewis Crews

Charles L. Schwab
& Associates
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W. W. Wheat & Son
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% Ward & Company
932 M. & M. Bldg.
Houston, Texas

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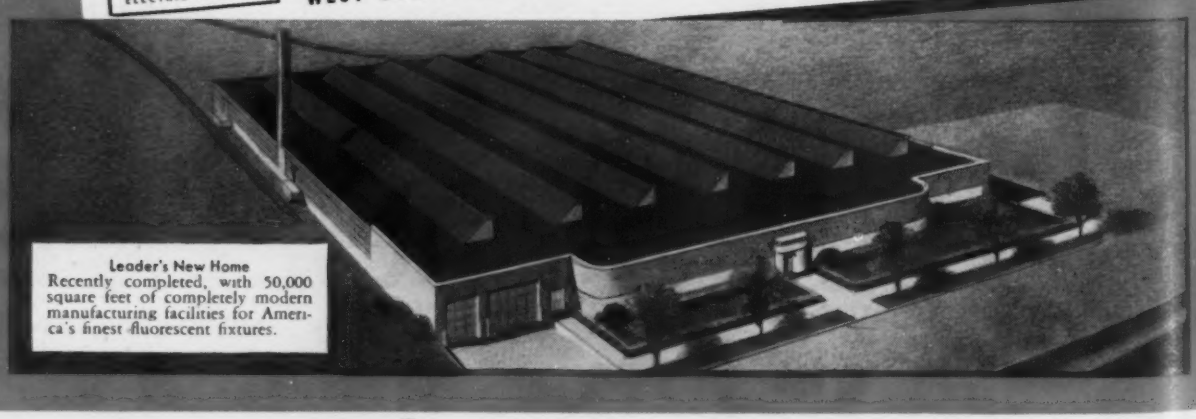
A STEP AHEAD
LEADER
ELECTRIC COMPANY

LEADER ELECTRIC COMPANY
3500 N. KEDZIE AVE. • CHICAGO, ILL.
WEST COAST FACTORY • 2040 LIVINGSTON ST., OAKLAND 6, CALIF.



Leader's New Home
Recently completed, with 50,000 square feet of completely modern manufacturing facilities for America's finest fluorescent fixtures.

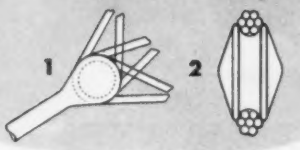
Build LINE SECURITY with CHANCE ANCHORS ..the EXPANDING ANCHOR Digs In and Holds!

Chance All Steel Expanding Anchors are specified by engineers who know the value of equal distribution of holding power.

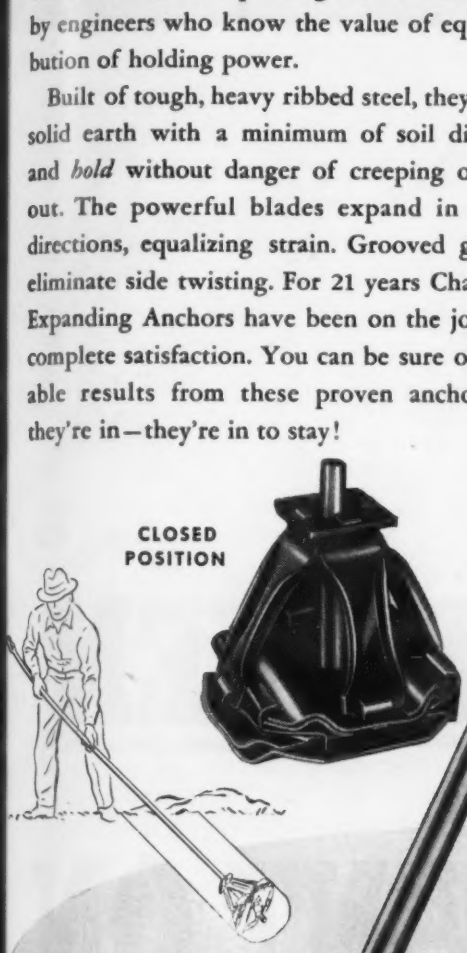
Built of tough, heavy ribbed steel, they *dig in* to solid earth with a minimum of soil disturbance and *hold* without danger of creeping or pulling out. The powerful blades expand in opposite directions, equalizing strain. Grooved guideways eliminate side twisting. For 21 years Chance Steel Expanding Anchors have been on the job, giving complete satisfaction. You can be sure of dependable results from these proven anchors. Once they're in—they're in to stay!

Improved Thimbleye FORGED STEEL ROD

This high strength, drop forged steel rod features the improved Chance Thimbleye.



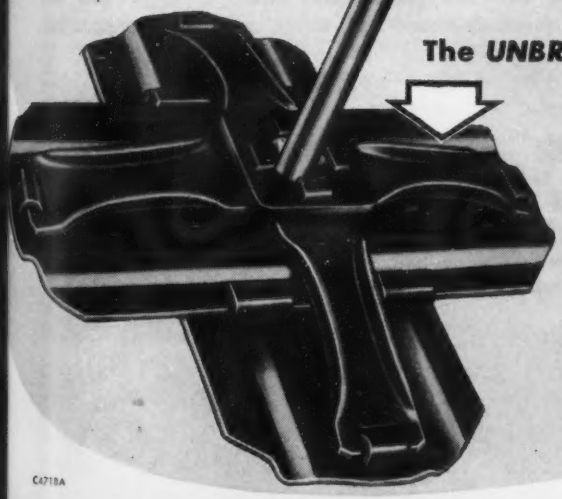
1. **Full rounded eye protects strand at varied angles, aids slack pulling.**
2. **Groove fits snugly around strand and prevents flattening or spreading.**



DESTRUCTIBLE NUT RETAINER...

The patented nut retainer prevents the anchor from riding up the rod during installation. Permits driving the rod through the anchor into the ground when abandoning the anchor, and also acts as a truss brace.

The *UNBREAKABLE* ALL STEEL ANCHOR



Chance Expanding Anchors are built to "take it" both in handling and in the ground. The new expanding arm (arrow) is 60% stronger—will not buckle—assures full expansion of blades.

How much will an anchor HOLD?

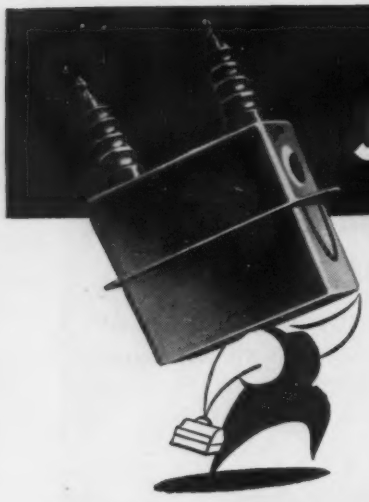
Chance engineers have developed a new formula for determining the type and kind of anchor to use for every guying condition. Your copy is ready and will be sent upon request.

C4718A

A·B·CHANCE CO·

CENTRALIA, MISSOURI · SAN FRANCISCO, CALIFORNIA

ABC INDUSTRIES



JOHNNY CAPACITOR'S

ON-THE-SPOT KILOVARS ARE EVEN MORE IMPORTANT ON INTERCONNECTED SYSTEMS

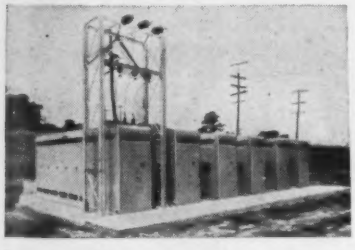
KILOVAR ECONOMICS #4

Johnny says:

"As system designers turn to interconnections and heavier line loadings to deliver more power with less plant, they are finding that kilovars must be given more consideration. All the penalties from kilovar transportation become exaggerated. Distances are greater. Losses are more important. Regulation becomes critical."

The philosophy of dealing with kilovars and kilowatts as two independent commodities, long used by load dispatchers, provides a practical and straightforward means of analyzing and designing systems. Under this concept, it becomes entirely logical to produce kilovars by auxiliary means, such as capacitors, at or near the load and thereby release line capacity for carrying additional kilowatts of pay load.

Capacitors, therefore, have become one of the most important economic tools available to the system planner and designer in meeting the pressure to deliver more power at lower cost. Capacitors make it possible to deliver 10, 15, or 20 per cent more kilowatts without increasing total amperes flowing through the system. Where voltage drop limits loadings, capacitors can reduce it to an unimportant factor. They can cut cost of power purchased through interconnections. And, while doing all these, they lower the total system investment per kilowatt of capacity—and reduce copper losses by a quarter to a third.



A General Electric field representative will be glad to explain in further detail the specific advantages of applying capacitors to *your* system. Write to *Apparatus Department, General Electric Company, Schenectady 5, N. Y.*

HERE IS
the dollar and cents side
OF CAPACITORS

When kilovars are supplied by capacitors at or near the load, from 2 to 6 per cent of the system investment is chargeable to this non-revenue-producing load. When kilovars are generated at the central stations, and supplied over a system designed primarily to deliver kilowatts, 20 to 25* per cent of the total investment is tied up.

*For systems operating at about 80 per cent power factor.

8 MILLION KILOVARS OF CAPACITORS NOW USED IN THE UNITED STATES

Users of capacitors for on-the-spot kilovar generation include these outstanding utility companies: Central Maine Power Company, with 23 per cent of its peak load in capacitors; Tampa Electric Company—20%; New Orleans Public Service Inc.—21%; Brockton Edison Company—34%. Each of these companies is enthusiastic about capacitors *as a means of cutting down system investment!*

GENERAL ELECTRIC

407-116

Use them inside or OUTDOORS!

It's all the same to Type WMK

RAINTIGHT and WATERTIGHT*

Enclosed Safety Switch

CONDULETS

**NEMA Types III and IV*

Safety. Positive interlock prevents opening the case unless switch is "off." Dead front switch is held in "off" position while case is open.

Switches. Quick make and break mechanism. Double break, reinforced, positive pressure-type blade and jaw construction. Positive pressure fuse clips. Combination solder or solderless wire lugs.

Cast metal case. Strong and durable. Four sturdy mounting feet. Many possible threaded hub arrangements for both vertical and horizontal conduit. Cover may be padlocked to prevent unauthorized entry. Operating handle may be padlocked "on" or "off."

Permanent lubrication in the threaded operating shaft bearings resists corrosion and prevents the entrance of dust and moisture.

Horsepower ratings. 2 through 50-H.P. 30, 60, 100 or 200-ampere. 230-575-volt A.C. 250-600-volt D.C.

Listed in Condulet Catalog 2500, Section 50, Page 20.

CONDULET is a coined word registered in the U. S. Patent Office. It designates a product made only by the Crouse-Hinds Company.

A Nationwide Distribution Through Electrical Wholesalers

Our 50th Anniversary
1897 — 1947

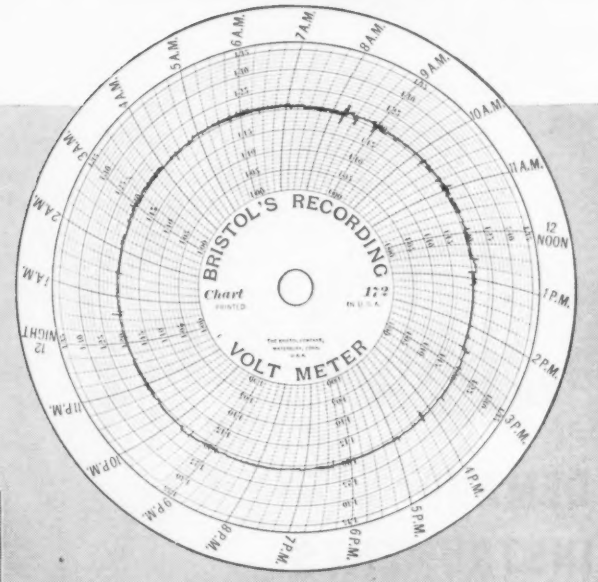
CROUSE-HINDS COMPANY
Syracuse 1, N. Y.

Offices: Birmingham — Boston — Buffalo — Chicago — Cincinnati — Cleveland — Dallas — Denver — Detroit — Houston — Indianapolis Kansas City — Los Angeles — Milwaukee — Minneapolis — New York — Philadelphia — Pittsburgh — Portland, Ore. — San Francisco Seattle — St. Louis — Washington. *Resident Representatives:* Albany — Atlanta — Charlotte — New Orleans
CROUSE-HINDS COMPANY OF CANADA, LTD., *Main Office and Plant:* TORONTO, ONT.

CONDULETS
FLOODLIGHTS
TRAFFIC SIGNALS
AIRPORT LIGHTING

MODERN ALLIS-CHALMERS *DFR REGULATORS

HOLD ± 1v. BAND



. . . and Use 2/3 Less Exciting Current!

Exciting Current Tells The Story

% Excitation Current Requirements based on Regulator kva

THE ONLY COMPLETE LINE OF ⅝% STEP REGULATORS

DFR—Standard sizes for single phase regulation up to 6,900 v, 250 kva

AFR—Standard sizes for three phase regulation up to 69 kv, 750 kva

YOU CAN MAINTAIN ± 1 volt band width—without high excitation with the Modern Allis-Chalmers *DFR regulator. No other regulator gives both close control *and* low excitation. *Old type* regulators require at least 25% excitation. Think of that high exciting current in terms of cost of equipment used for unnecessary excitation of regulators . . . in terms of installed capacitors . . . at $10 per kva . . . needed to balance high exciting current.

Compare! Compare with the Allis-Chalmers *DFR regulator . . . the regulator that holds a ± 1 volt band, yet requires but 8% excitation . . . 2/3 less than any other single phase regulator. Then investigate the Modern DFR step type regulator. More than 14 years of use in regulating over 5,000,000 kva has proved the principle of step regulation sound—the design rugged.

For further details on how you can save 2/3 of excitation current, call your nearby A-C office, or write ALLIS-CHALMERS, MILWAUKEE 1, WIS. A 2308

* **DFR** — the only station type step regulator you can buy for single phase duty

ALLIS-CHALMERS

One of the Big 3 in Electric Power Equipment — Biggest of All in Range of Industrial Products

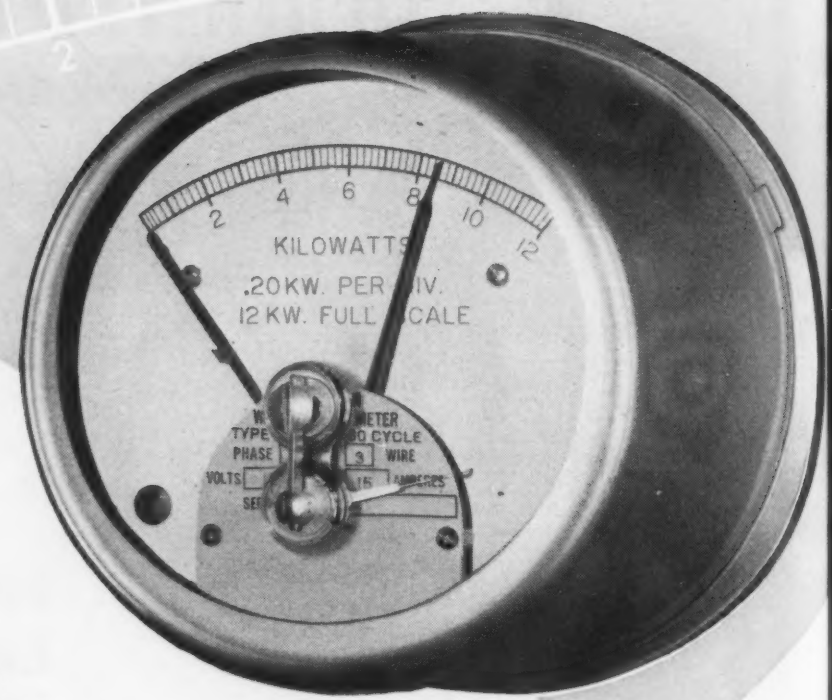
1847 1947
A CENTURY OF SERVICE to Industry THAT MADE America Great

measured demand

SANGAMO

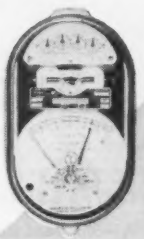
DEMAND INSTRUMENTS

The increasing dissimilarity of modern loads of commercial customers makes it impractical to use averages in establishing a sound basis for recovery of fixed charges. The large proportion of plant investment in relation to the total cost of service deserves exact determination of demand. This can best be done by measurement. Sangamo Lincoln-Type WD Demand Meters are simple, accurate, and economical instruments for this purpose. Sangamo Demand Instruments are available in an extensive line—designed for your particular needs.

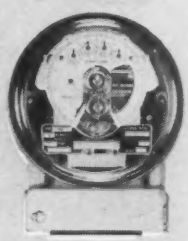


TYPE WDS

Sangamo Lincoln-Type WD Demand Meters are made in both A and S construction for any single phase or polyphase circuit for the measurement of kilowatt demand. Operating independently of the watthour meters, these instruments are a convenient means of obtaining demand on existing watthour meter installations, as well as on new services.



TYPE JWS



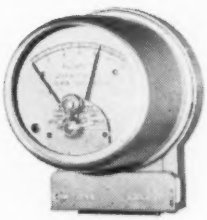
TYPE LC-3 WITH LG DEMAND REGISTER

Combination Watthour and Lincoln Demand Meter, and meter with demand register, for installations where mounting space is limited.

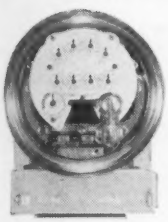
assures recovery of fixed charges!

Choose your demand meter from this extensive line...

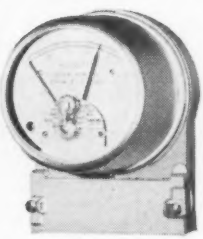
TYPE JS WITH
JG DEMAND REGISTER



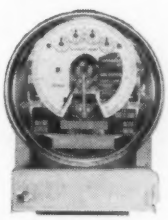
TYPE WDA



TYPE JA WITH
JGC DEMAND REGISTER



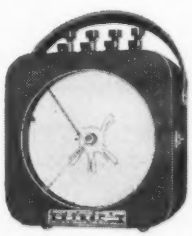
TYPE WDP



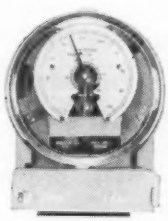
TYPE JA WITH
JG DEMAND REGISTER

TYPE JWA

TYPE LCS WITH
LG DEMAND REGISTER



TYPE CCW



TYPE AG
CONTACT OPERATED

TYPE AD

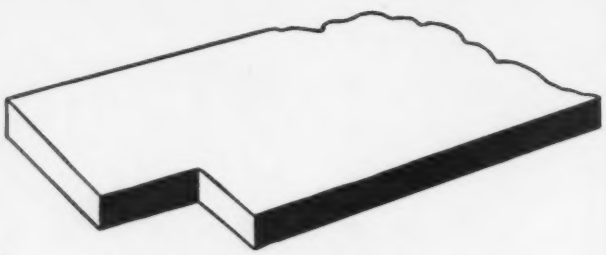
SANGAMO
ELECTRIC COMPANY
SPRINGFIELD, ILLINOIS

SM471

UNION PACIFIC

TREASURE MAP OF INDUSTRY

Nebraska*



* *One of a series of advertisements based on industrial opportunities in the states served by the Union Pacific Railroad.*

- LARGE SOURCE OF FARM PRODUCTS
- LEADER IN DAIRY PRODUCTS
- MAJOR LIVESTOCK PACKING AND PROCESSING CENTER
- AMPLE WATER SUPPLY
- NATURAL GAS, COAL, OIL AND ELECTRIC POWER
- RICH MINERAL DEPOSITS
- DIVERSIFIED INDUSTRIAL ACTIVITY
- STRATEGIC DISTRIBUTION LOCATION
- EXCELLENT RAIL TRANSPORTATION
- SKILLED, FAIR-MINDED LABOR
- NO SALES OR INCOME TAX

Industries engaged in the packing or processing of farm products find Nebraska a rich source of raw materials. Corn, grains, sugar beets, potatoes and other vegetables are grown in abundance.

Omaha is a leading meat packing and poultry processing center. It frequently leads the nation in livestock receipts, is located in the world's largest butter producing area, and houses the nation's second largest industrial alcohol plant.

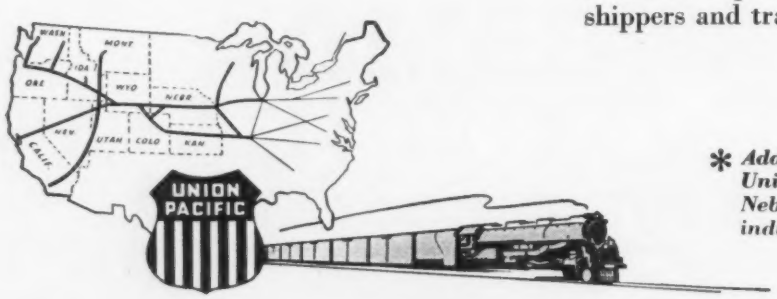
In addition to agricultural activity, there is diversified industrial manufacturing such as farm machinery, air conditioning equipment, fabricated steel, brick and tile.

Nebraska has large mineral deposits; gypsum, salt, potash, sand, gravel, stone, etc. Natural gas, petroleum and coal are readily available.

Of particular interest to industry is Nebraska's "pay-as-you-go" policy; no state sales, income or luxury taxes. It is a good place to work and live.

★ ★ ★

In Omaha are the headquarters of the Union Pacific Railroad which provides efficient, dependable transportation for shippers and travelers.



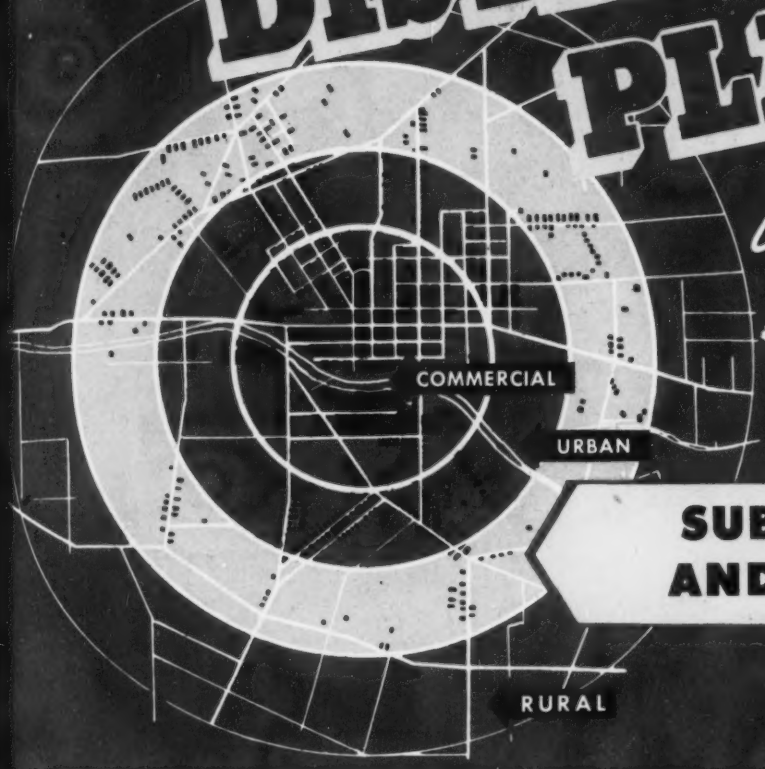
* *Address Industrial Department, Union Pacific Railroad, Omaha 2, Nebr., for information regarding industrial sites.*

UNION PACIFIC RAILROAD

THE STRATEGIC MIDDLE ROUTE

POWER DISTRIBUTION PLANNING

for Better Service Lower Costs...

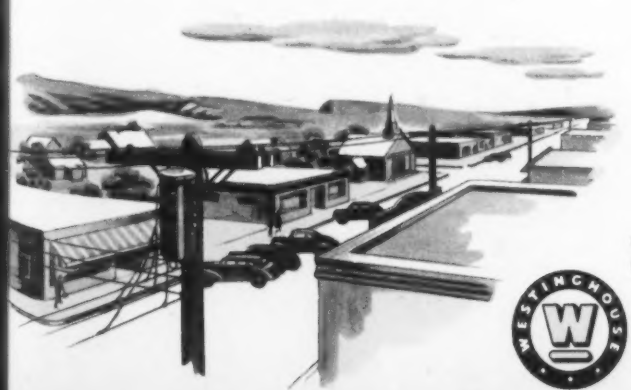


SUBURBAN AREAS AND SMALL TOWNS

Many of the suburban areas and small towns only a few years ago were the rural areas; a few years hence many of them will have load densities equal to those in today's urban areas. Consequently, power distribution planning for the present suburban areas and small towns involves careful system design coupled with selection of high-quality apparatus which will adapt itself to the rapidly increasing and changing load densities.

As designer and manufacturer of a Complete Correlated Line of Distribution Apparatus, Westinghouse is in an excellent position to offer co-ordinated planning and engineering service for any type of system development or extension.

This is the second of a series of system layouts showing how Westinghouse equipment can be applied—to improve system operation, increase reliability of service and reduce system costs.



New load in suburban areas and small towns will evolve from new homes built on now vacant lots, the increasing use of appliances in the homes and the development of new commercial areas. This will result in a marked increase in load density in many of the present-day suburban areas and small towns.

Planning the future involves the original selection of proper correlated apparatus and system layout, both of which will be readily adaptable to necessary system changes resulting from increased load requirements.

Specific characteristics of today's suburban loads with reference to their growth into those of heavier densities:

1. **LOAD DENSITY** . . . Light and medium load density—heavier than that in the rural areas with great possibilities for rapid growth. Eventually, as the load increases and approaches that of the urban area densities, the system may require revamping into a secondary network either overhead or underground.
2. **PRIMARY FEEDERS** . . . The populated sections of suburban areas are small and compact resulting in short primary feeders. Steady expansion of these sections within the surburban area draws them together and, in some instances, makes it possible to tie adjacent feeders together to provide emergency power supply.
3. **VOLTAGE REGULATION** . . . Voltage regulation is usually provided at the substation. However, for economical loading of *all* the feeders, a long lateral may require installation of additional regulating equipment.
4. **LIGHT FLICKER** . . . The increased use of heavy appliances—particularly motor-driven appliances such as washers, ironers, refrigerators and air conditioning equipment—tend to cause light flicker.

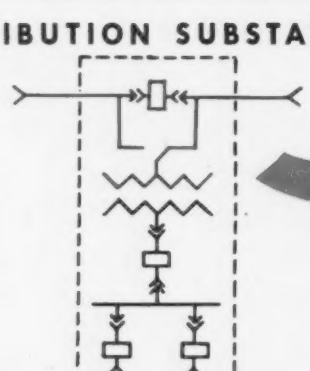
On the inside pages are specific recommendations for serving these suburban areas with maximum reliability and economy.

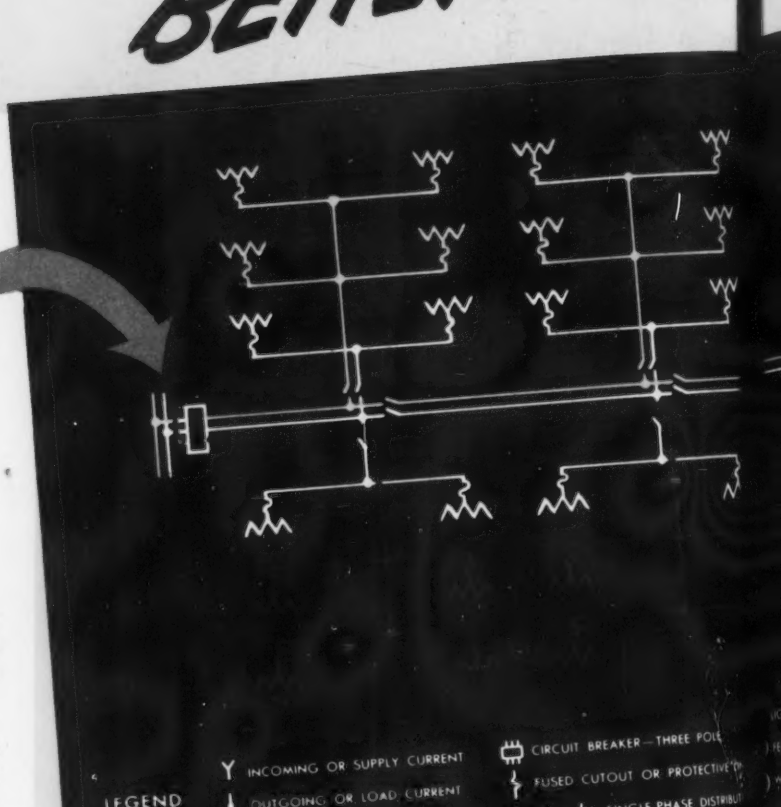
Westinghouse

PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

LOWER Suburban Distribution Cost
BETTER Servic

DISTRIBUTION SUBSTATION





The first factor and a most important one for present and future planning for suburban areas and small towns is the careful selection of the distribution substation.

Wherever it is necessary to use two or more primary feeders, the Westinghouse Multi-feeder Unit Substation with throat connected transformer and switchgear assures maximum service continuity. This self-contained substation combines voltage transformation, automatic voltage regulation, thermal and lightning protection, control and metering into one attractive, completely-enclosed, factory-assembled and tested Unit . . . *all* the functions performed by separate pieces of apparatus in the open-structure, conventional-type substation.

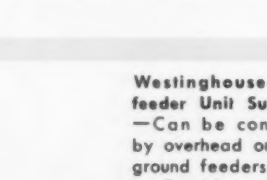
In the lighter-populated areas where only a single feeder is required at the present time, the CSP Power Transformer is the last word in "Packaged Power". Another feeder, when required by load growth, can be readily provided by simply installing another CSP Power Transformer.

Wherever conventional, open-structure substations are used, the reliability and continuity of service depends upon quality and co-ordination of the many associated items . . . power fuses, disconnects, arresters, breakers, regulators, etc.

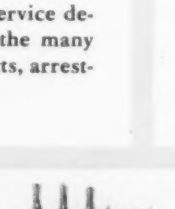
PRIMARY FEEDERS

Generally small towns and suburban areas are served with radial systems consisting of several primary feeders. Load growth may ultimately make it possible to tie adjacent feeders together to form a loop-radial system.

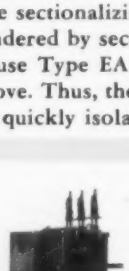
The reduced number of circuit miles in primary feeders for suburban areas as compared with rural lines, and the decreased severity of lightning exposure, greatly reduces the likelihood of faults on a feeder. This results in often omitting automatic line sectionalizing. However, high-quality service can still be rendered by sectionalizing the primary feeder using Westinghouse Type EA Fuse Cutouts, properly applied as indicated above. Thus, the effects of temporary or permanent faults can be quickly isolated disturbing a minimum of customers.



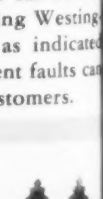
Westinghouse Multi-feeder Unit Substation—Can be connected by overhead or underground feeders. Details in Booklets B-3238 and B-3468.



Westinghouse Single-feeder Substation—CSP Power Transformer and Switchgear in pre-assembled unit. Details in B-3238, B-3468 and D. B. 48-100.



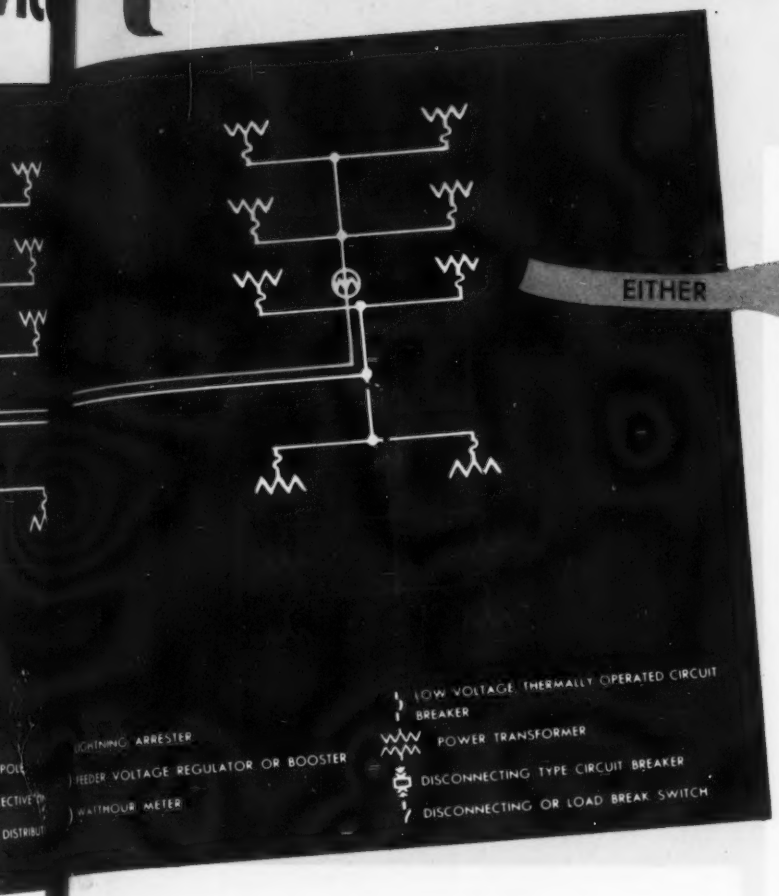
Westinghouse Type SU Voltage Regulator. Described in Catalog Section 47-155 or Booklet B-3080.



Capacitors for power-factor correction. Catalog Section 49-000 or Booklet B-3204.

WESTINGHOUSE DISTRIBUTION APPARATU

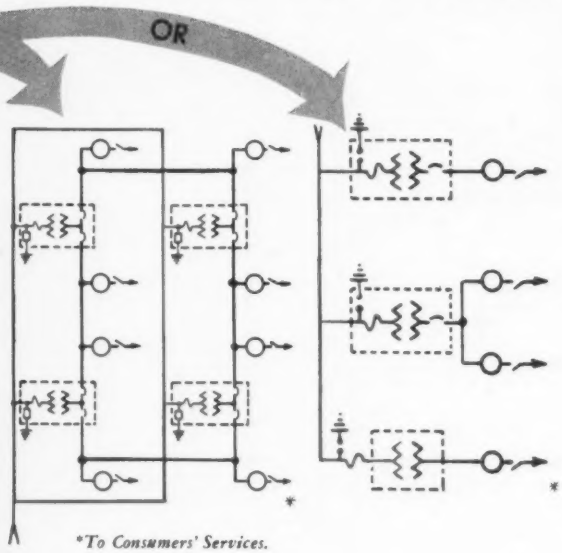
★ A BASIC FLEXIBLE SYSTEM
★ CORRELATED QUALITY EQUIPMENT


LOW VOLTAGE THERMALLY OPERATED CIRCUIT BREAKER
POWER TRANSFORMER
DISCONNECTING TYPE CIRCUIT BREAKER
DISCONNECTING OR LOAD BREAK SWITCH
FEEDER VOLTAGE REGULATOR OR BOOSTER
WATTHOUR METER

Rapid load growth probabilities necessitate provision for close voltage regulation at the distribution substation and ultimately out on the primary feeders. Westinghouse single or Multi-feeder Unit Substation is usually equipped with self-contained, automatic voltage regulating equipment. Further, Westinghouse manufactures a complete line of all types of feeder voltage regulators for use in conventional substations or out on the primary feeders. Properly applied, these regulators prevent low voltage, consequent poor service to consumers and loss of revenue.

Westinghouse inerteen, shunt capacitors connected along the primary feeders improve power-factor, voltage regulation and, at the same time, permit the addition of new loads without increase in wire size.

DISTRIBUTION TRANSFORMERS SECONDARIES AND SERVICES



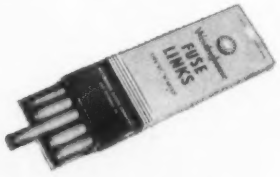
**To Consumers' Services.*

Improved service is realized where radial secondaries are supplied by the Westinghouse CSP Distribution Transformer. This transformer, with automatic indication of overloads, gives the required protection plus loading by copper temperature.

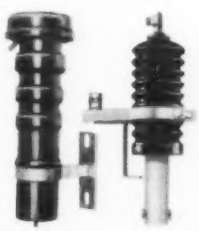
In rapidly growing areas, secondary banking with CSPB Distribution Transformers (described on the next page) affords many of the advantages of the secondary network system—with the low cost of the radial system.

The conventional transformer, the Westinghouse Type "S", protected by the "EA" drop-out fuse cutout and "LV" autovalve or "De-ion" type arrester, is a well co-ordinated combination.

Meters . . . the life-time meter incorporates all the Westinghouse contributions to the art, assuring true and reliable metering to the utility as well as the consumer.

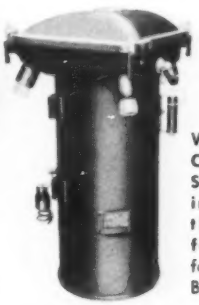


Westinghouse Type EA Fuse Cutouts, Type UT and Super Surge Fuse Links. Described in Catalog Sections 38-625, 36-665 and Booklet B-3833.



Westinghouse Lightning Arresters. Booklet B-3417.

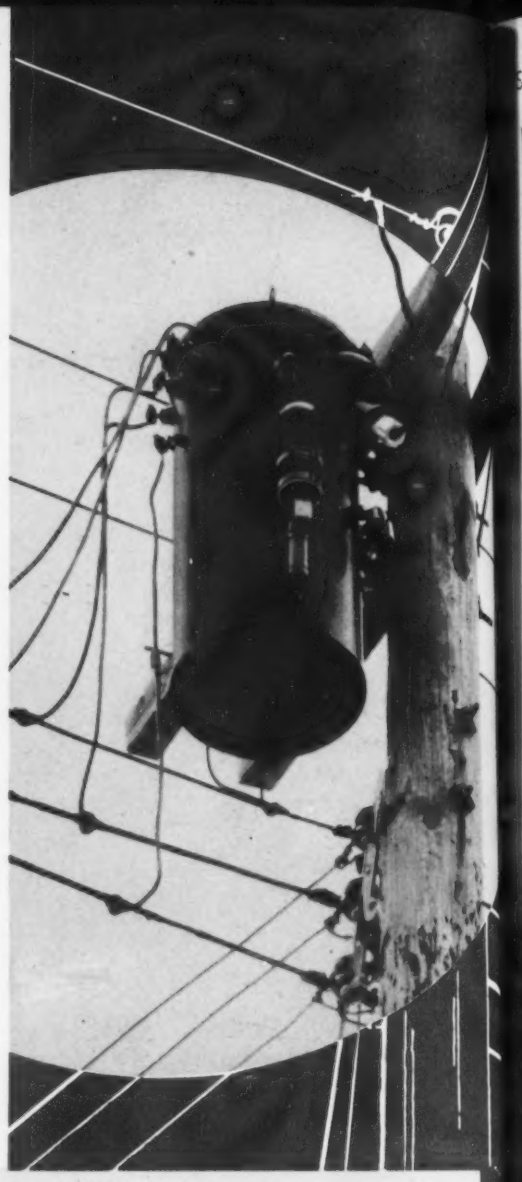
Westinghouse Watthour Meter. Details in Catalog Section 42-000 or Booklet B-2247.



Westinghouse Completely Self-Protecting Distribution Transformers—Ask for Descriptive Bulletin 46-100.

A COMPLETE AND CORRELATED LINE

Plan for your *GROWING SUBURBAN AREAS* with CSPB Transformers for Secondary Banking



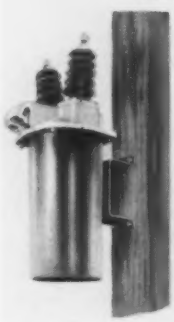
Costs must be lowered and voltage regulation improved to economically serve the growing loads in average residential areas—where the load is not heavy enough to justify a network system, yet heavier than in rural areas. The Westinghouse CSPB Transformer for banked secondary operation is the answer to this problem.

All the benefits of banked secondary service are provided by CSPB Transformers without the disadvantages of conventional banking. Installations to date show reductions in transformer capacity of 35%, or more; thus a material saving in equipment costs.

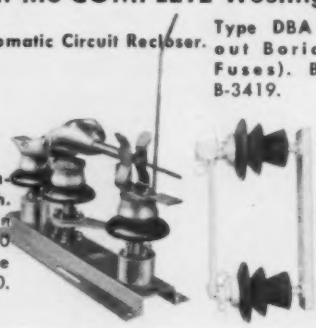
Operation is simplified by signal lights—one for each of the internal breakers—permitting quick location of line faults or overload sections.

Voltage regulation is improved . . . light flicker greatly reduced . . . sectionalizing protection is assured without the danger of cascading . . . full thermal capacity of *all* transformers is always available. Get the full story of CSPB advantages—ask or write for Booklet B-3777.

Other items in the COMPLETE Westinghouse line of Distribution Apparatus



New GR Automatic Circuit Recloser.



Type DBA (Drop-out Boric Acid Fuses). Booklet B-3419.

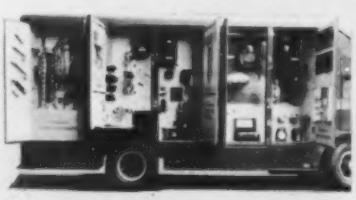
Instruments. For any purpose. See Catalog Section 43-000.

Type V Disconnecting Switch. Described in Booklet B-3480 or Descriptive Bulletin 36-160.

Instrument Transformers. Cat. Sec. 45-100.

Street Lighting. Complete equipment of all types. Catalog Section 60-000.

NOW TOURING THE COUNTRY...



"A COMPLETE POWER LINE ON WHEELS"

With this Demonstration-Display Truck, specially-trained Westinghouse electrical engineers present a complete, co-ordinated power distribution system functioning under all conditions. Lightning surges of 100,000 volts are generated; actual short circuits of 50 amperes at 2,400 volts are produced.

If you haven't already seen one of the demonstrations—

DON'T MISS IT WHEN IT COMES TO YOUR DISTRICT!

Westinghouse

PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

DISTRICT APPARATUS

A COMPLETE AND CORRELATED LINE

ONE ACCIDENT CAN COST MORE—

—in lost man hours

—in production delays

—in jittery morale that destroys efficiency and makes other employees accident prone

—than the entire cost of scientific safety through modern Color Engineering

Safety *rules* are not enough. You have to *create* safety —*practice* accident prevention!

Unmarked danger areas—eye-straining work light—dull, drab surroundings—haphazard flow of plant traffic! All these are *causes* of fatigue, apathy, carelessness, inefficiency, *accidents*.

Why run risks? Color Engineering by Fuller can help correct the dangers.

What to do? Let a trained Fuller representative survey your plant from front office to freight platform—recommend *in writing* a color system exactly fitted to your building, your equipment, your work plan. No obligation!

Color *engineer* your place. Watch morale rise, efficiency increase, production delays lessen, accident costs drop. Money in the bank! W. P. Fuller & Co. San Francisco. Branches and Dealers throughout the West.

FREE:—Charts, guides, full-color before-and-after examples—20 pages packed with paying data—in our book, "Color Engineering by Fuller." Get one!

FULLER FINISHES

Largest Because Locke has contributed most

Since Fred M. Locke made the first wet process porcelain insulator in 1893, Locke has continued to grow and lead.

Today, the world's largest manufacturer of porcelain insulators jealously guards its 55 year heritage of superior product performance with *Quality Control* – a scientific system of tests made at each step in its manufacturing process. It's another "First" in manufacturing for the industry. Locke Insulator Corporation, Baltimore, Maryland.

Locke INSULATORS and POLE LINE HARDWARE

FIRST IN CLAYRAMICS

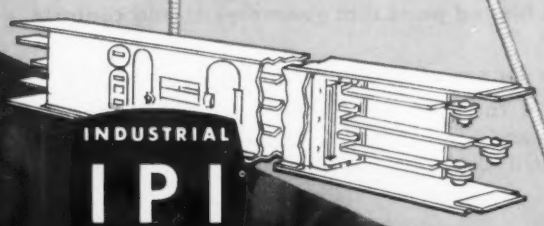
10 QUICK facts... ...tell why

NATIONAL ELECTRIC

IPI* BUS raises plant efficiency

* Industrial Plug-In Bus

1. National Electric IPI Bus is a *flexible* electrical distribution system
2. Takes the power source to the load
3. No distribution panel boards required
4. Machines can be plugged in or disconnected without shutting down production lines
5. "Plug-In" locations spaced every 15 inches on each side of bus provide staggered load-connection points every 7 1/2 inches . . . Makes every foot of the system usable
6. System can be extended or relocated when production requirements change
7. Bus bars can be changed to increase capacity
8. "Plug-In" devices may be fused disconnects, unfused or fusible safety switches or circuit breakers
9. Self-contained, easily installed, 100% salvageable
10. Fireproof, dust tight and fully approved by Underwriters' Laboratories, Inc.



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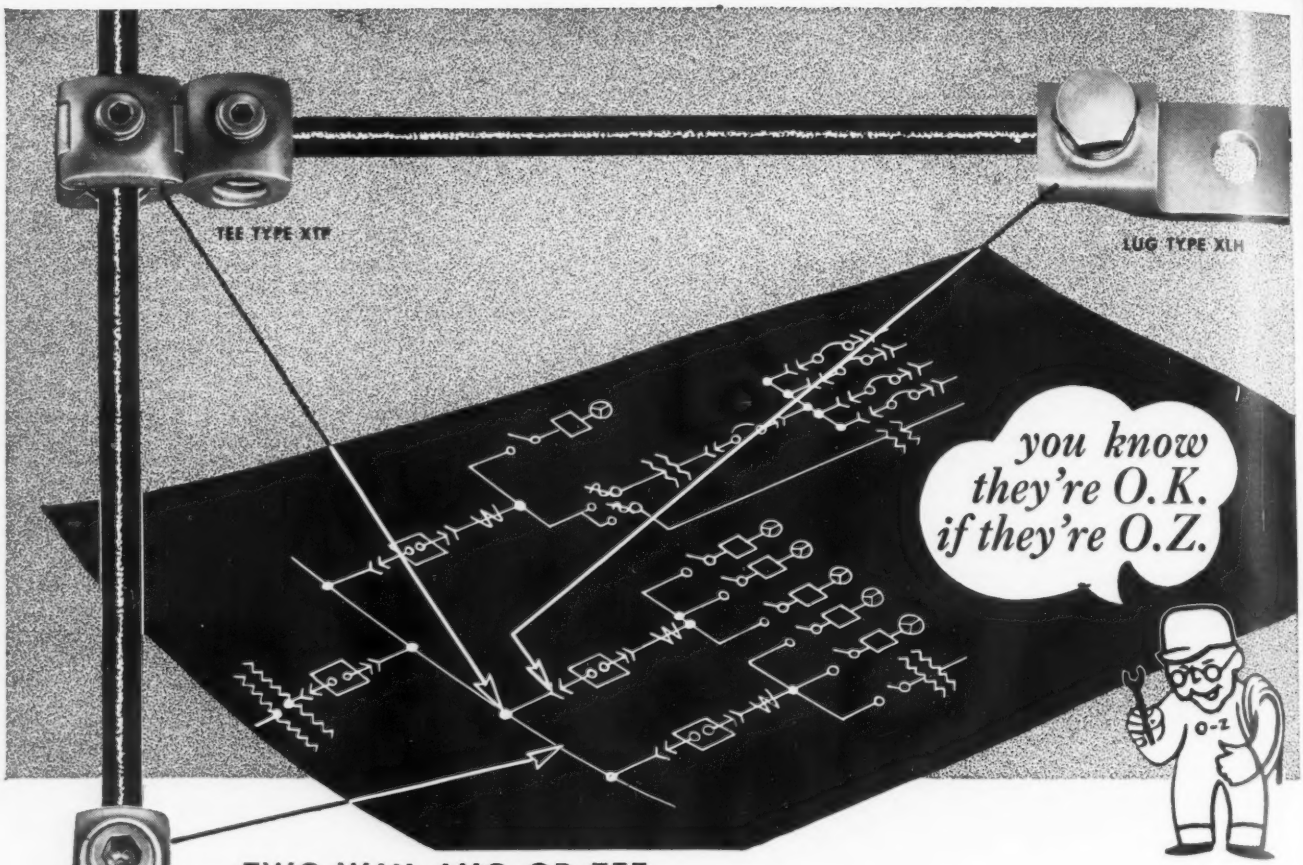
NATIONAL ELECTRIC PRODUCTS
NE
WIRING SYSTEMS
WIRES AND CABLES

National Electric Products Corporation

Pittsburgh 30, Pa.



TWO-WAY, LUG OR TEE . . .

GET PERMANENT CONNECTIONS WITH ALL THREE . . .

TWO-WAY TYPE XW

Whenever you're tapping, butting, terminating, put in **O.Z.** solderless connectors—then you're sure of permanent connections . . . *always*. There's a solderless connector in O. Z.'s complete line of thirty different types that will assure you fast, easy installation—as well as positive, strong connections—on any wire in any of the wide range of sizes used in building installations. Here are a few of the features that make O. Z. solderless connectors outstanding:

Tin-plated spring steel lock washers that hold their resiliency, maintain pressure—permanently.

Serrated pressure plates that give maximum bite for positive grip.

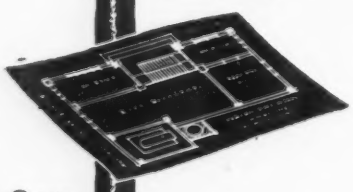
Highly conductive copper alloy body that is acid dipped to assure low resistance contact.

Extra strong copper alloy bolts and hinged parts that guarantee strong contacts, give lasting mechanical strength.

Simplicity of one-piece construction for speed of assembly—no parts to lose.

Ask nothing less than permanency of the connectors you use! Ask your distributor for O. Z. solderless connectors. He can supply an O. Z. connector for every type of application. He also carries a full line of O. Z. Insulated Bushings, End Fittings, and Split Couplings—equally unmatched for performance!

All types of O. Z. solderless connectors are satisfactory for aluminum building wire if ordered with the special Cadux plating.



3698

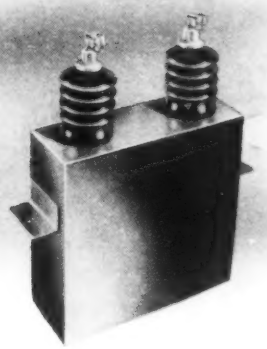
CONDUIT FITTINGS
SOLDERLESS CONNECTORS
CABLE TERMINATORS
CAST IRON BOXES
POWER CONNECTORS
GROUNDING DEVICES

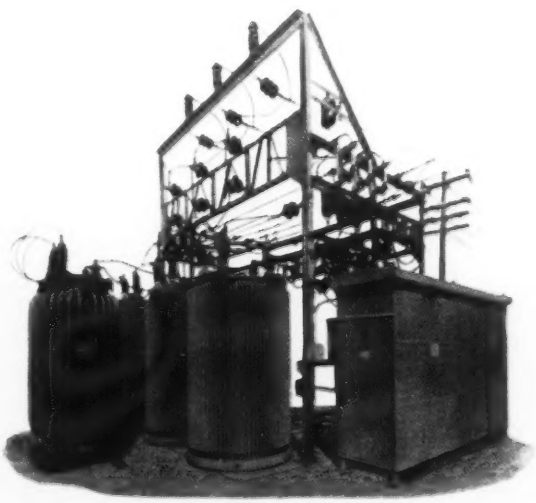
O.Z. ELECTRICAL MANUFACTURING COMPANY
262 BOND STREET · BROOKLYN 2, N. Y.

First Choice / **Proven in the Field . . . Not for 1 year but for 10 years!**

CORNELL-DUBILIER

CAPACITORS





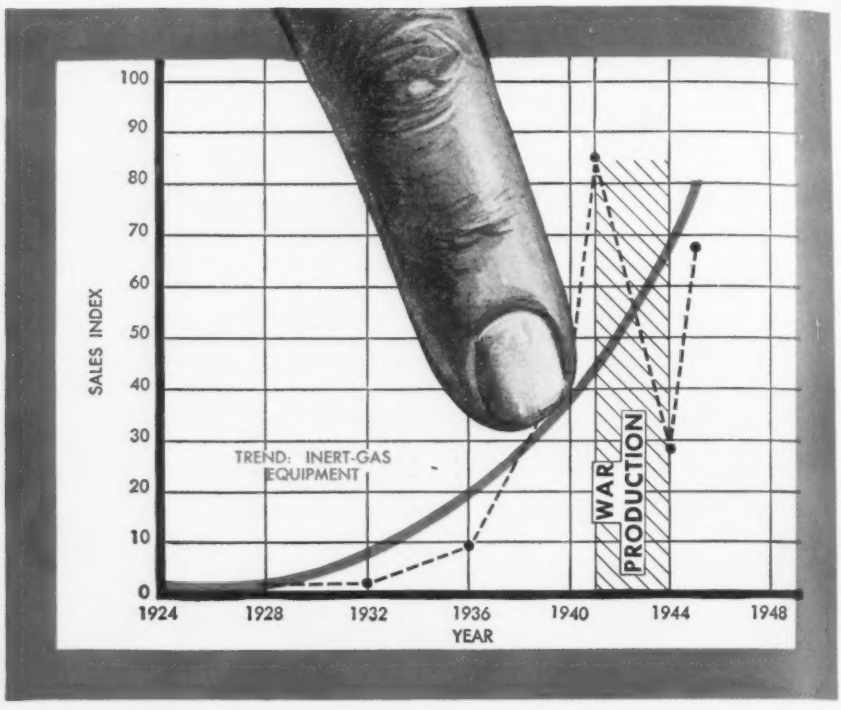
Dependability is the No. 1 reason why Cornell-Dubilier Capacitors are the first choice of power engineers. Proof of this dependability is yours in the service records of more than 3,000 utility installations. These field-test records for over ten years offer conclusive evidence of extraordinary trouble-free performance under punishing extremes of climate and operating conditions. C-D's can meet your system's specific requirements with greater value per dollar invested than any other capacitor. Write to Cornell-Dubilier Electric Corporation, Dept. D8, South Plainfield, New Jersey. Other plants in New Bedford, Worcester and Brookline, Mass., and Providence, R. I.

FOLLOW THE LEADERS • **DEMAND DEPENDABLE C-D CAPACITORS FOR YOUR PLANT**

CORNELL-DUBILIER • **WORLD'S LARGEST MANUFACTURER OF CAPACITORS**

This Curve Tells a Simple Transformer Story..

To Date, Allis-Chalmers *"Oil-Sealed"* Inert-Gas Systems—the Original and Still Most Simple on the Market, Have Been Specified on Over 5,000,000 kva of Transformer Capacity!



THERE'S DOUBLE-MEANING to this curve. It bears out the wide acceptance of the *principle* of inert-gas protection—pioneered by Allis-Chalmers as early as 1923.

And second, it shows the rising popularity of Allis-Chalmers *"Oil-Sealed"* inert-gas systems. The reasons for this trend should be of interest to every engineer responsible for designing low-cost, low-maintenance electric power distribution.

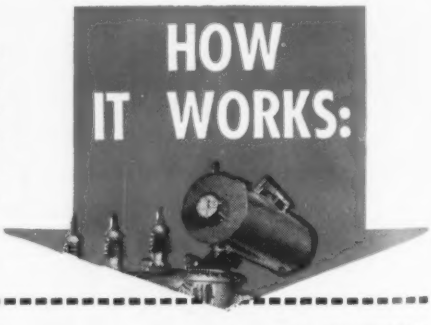
☛ Allis-Chalmers inert-gas protective system is the *original* oil-sealed system — and gives you the benefits of the longest experience in this field. For example, the first 18 systems supplied on 270,000 kva of transformer capacity are *still* giving a prominent Eastern Utility dependable operation today!

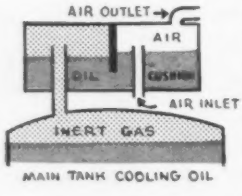
☛ It is the lowest-pressure system — with pressure generally not exceeding 1 lb per sq in. This means *less* pressure on gaskets, *lower* gasket maintenance.

☛ It is extremely simple! Its design eliminates sensitive gauges and reduction valves — thus eliminates maintenance of such instruments. Further, periodic replenishment of nitrogen is not needed . . . no bottles to buy.

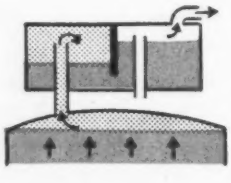
☛ Your choice of system location—top-of-tank or side-mounted.

Yes, that curve tells an important story . . . of Allis-Chalmers *leadership* in inert-gas protection . . . and of its leadership in electrical apparatus—based on 50 years of building transformers, 100 years of service to *all* industry! For details, call your nearby A-C office. ALLIS-CHALMERS, MILWAUKEE.

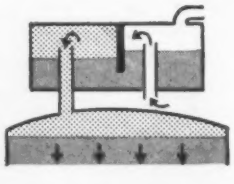




1 PRINCIPLE — Transformer cooling oil is isolated from the atmosphere by inert gas and oil seal. This prevents sludge formation and fire hazard due to oxygen. By excluding moisture the system maintains high dielectric quality of oil.



2 AS TRANSFORMER *HEATS*, the cooling oil expands, displacing inert gas from main tank to auxiliary tank. The transfer of gas to the auxiliary tank is cushioned by the change of oil levels as shown, keeping the main tank pressure low.



3 AS TRANSFORMER COOLS, the reverse takes place. In this simple manner inert-gas protection is provided automatically . . . transformer oil adjusts itself to changing temperatures without being exposed to the atmosphere.

A 2287

ALLIS·CHALMERS

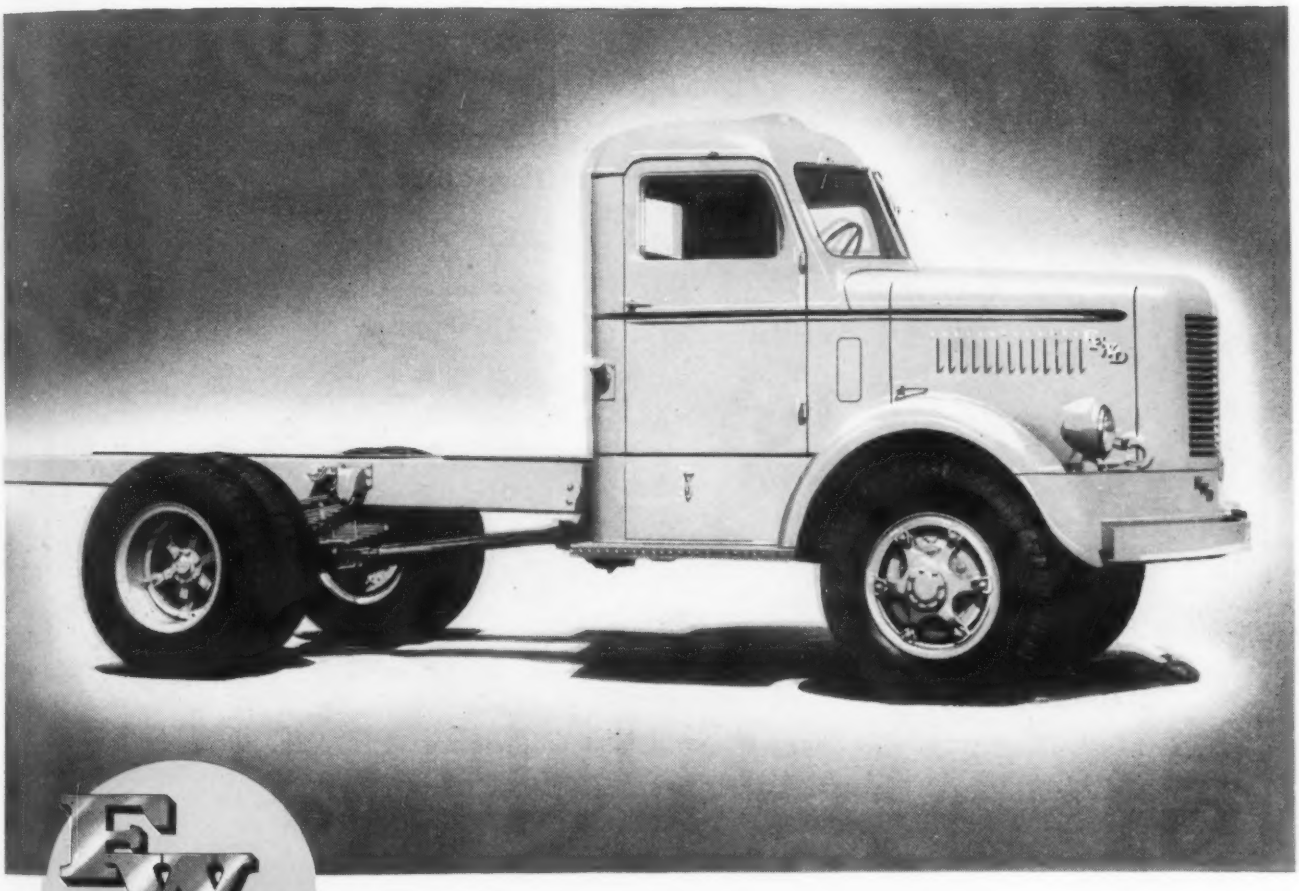
One of the Big 3 in Electric Power Equipment — Biggest of All in Range of Industrial Products

1847 1947 A CENTURY OF SERVICE to Industry THAT MADE America Great

THE TRUCK WITH A

$56,000,000.00 ENDORSEMENT

THE FWD "H" SERIES



FWD

America's Foremost Heavy-Duty Truck

A truly great truck — the FWD "H" Series — a truck that in just six years has won the endorsement of motor truck users to a total of $56,000,000.00 in purchases — a truck that offers the advantages of a phenomenal record of $56,000,000.00 in manufacturing experience.

Rated at 20,000 lbs. gross, the FWD "H" Series represents the highest development of the four-wheel-drive principle, pioneered by FWD in 1910, and recognized all over the world for outstanding heavy-duty performance.

FWD safety and surety—the dependable pulling power and traction of four driving wheels — the ability to do more work at low-cost-per-ton-mile, and to move capacity loads to location, on or off the highway — these FWD four-wheel-drive advantages are vitally important in heavy-duty trucking operations. Wherever motor truck performance must be more than usually dependable—in highway or municipal service, in utility line construction and maintenance, in oil-field operations, in heavy hauling on or off the highway — FWD four-wheel-drive trucks render valuable service.

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THE FOUR WHEEL DRIVE AUTO CO., Clintonville, Wisconsin

Canadian Factory: Kitchener, Ontario

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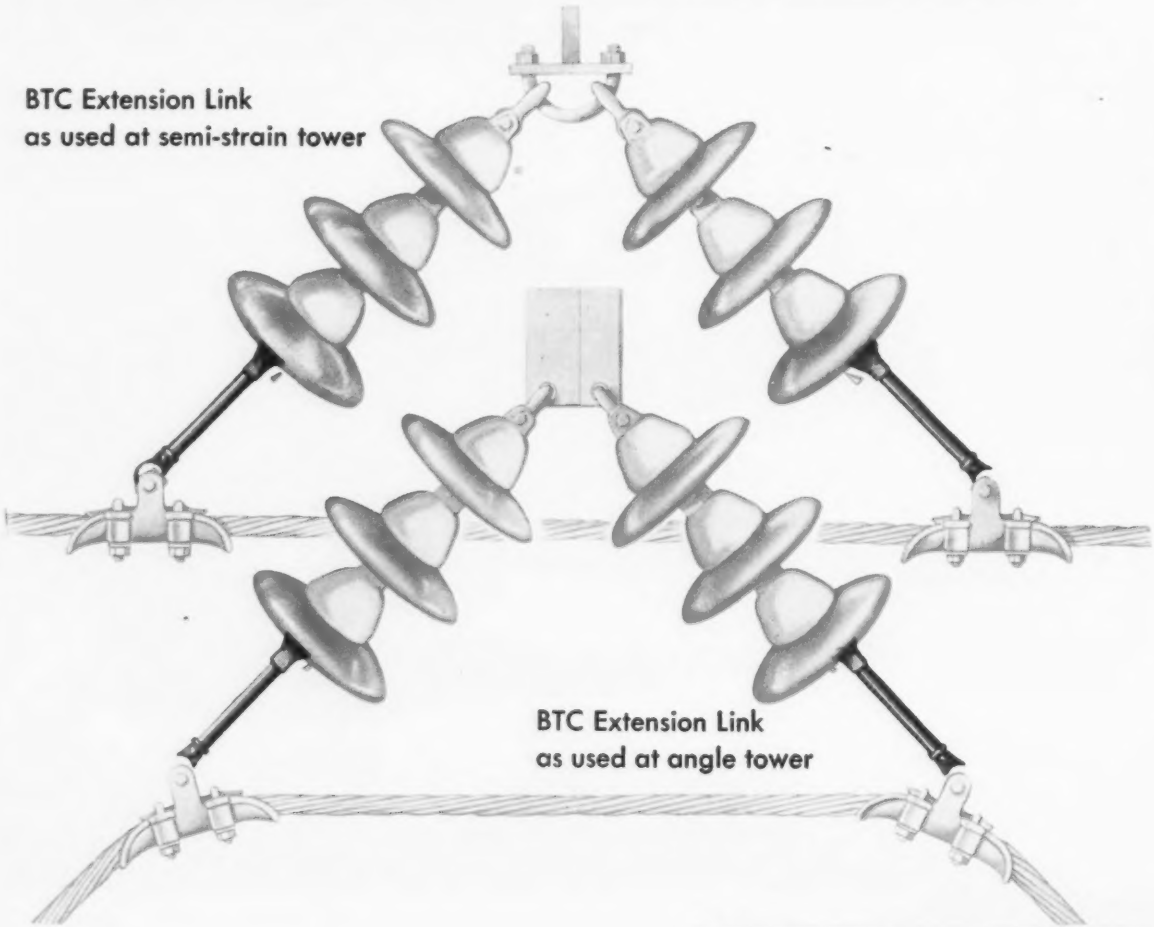
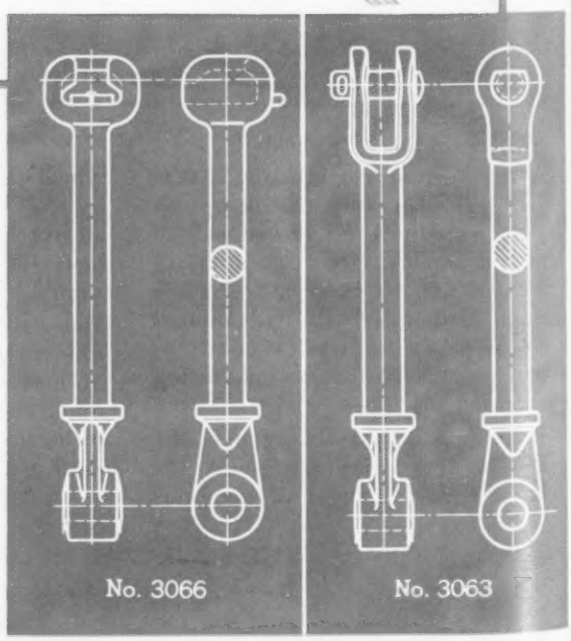
FOR TRANSMISSION LINE DESIGN USE BTC STANDARD DROP FORGED STEEL LINE HARDWARE for Special Construction Requirements



Special assemblies, required by Semi-Strain and Angle construction involving two insulator strings, can invariably be made up from *standard* BTC Clamps and Fittings.

For example, top-of-string to structure connections may be standard BTC Hooks, Ball Eyes or Clevises; standard BTC Socket Eye or Clevis Eye Extension Links may be inserted between insulator strings and conductor clamps.



Sold only through your insulator manufacturer

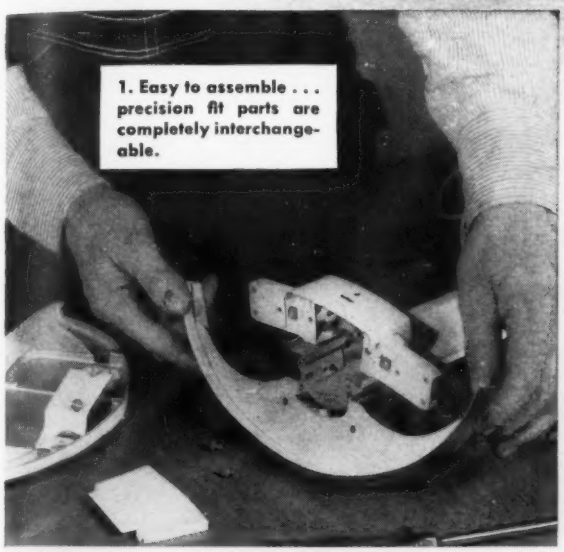
THE BREWER-TITCHENER CORPORATION
CORTLAND, NEW YORK

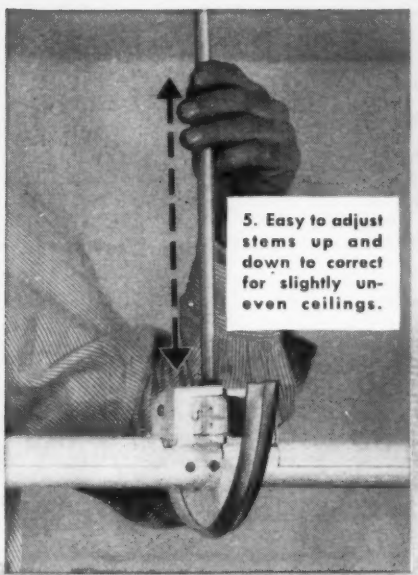
SEE HOW EASY

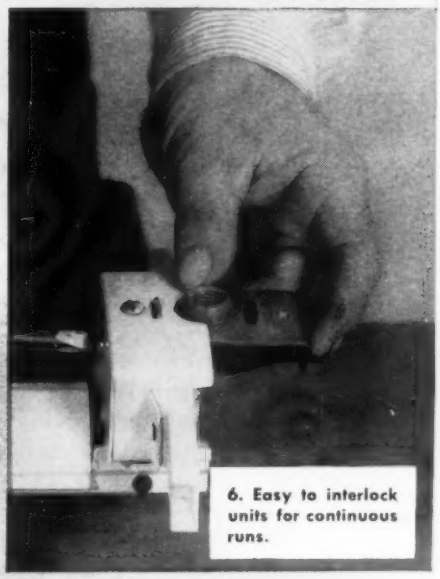
Wakefield

MAKES IT TO

"HANG THE SKY!"







. . . practical reasons why you'll want to sell Wakefield Over-ALL Lighting!

Engineered design plus "sure-fit" manufacturing save time, effort for you . . . when you hang the sky with Wakefield units. And folks in office, school, store and drafting room like the soft, pleasing effect, the easier seeing, and the better work that comes out of Over-ALL Lighting by Wakefield. Let it help you *sell* your customers and *serve* them!

Wakefield

LIGHTING EQUIPMENT FOR OFFICE, SCHOOL AND DRAFTING ROOM

For full details write for Catalog No. 46. The F. W. Wakefield Brass Co., Vermilion, Ohio.

Over-ALL—
in lighting,
in construction,
in ease of maintenance.

THE STAR

THE GRENADIER

THE COMMODORE

THE DIPLOMAT

This "slot" always pays off

DESIGNERS can lay out electrical systems with what seems to be ample allowance for future needs.

But they aren't fortune tellers. They can't foresee that some day a machine will have to be moved, an entire line relocated, or a lighting set-up shifted.

That's why it's wise to specify BullDog Universal Trol-E-Duct with the slot that always pays off. Universal Trol-E-Duct is slotted over its entire length. *So every inch is a potential outlet* to supply needed current for any type of lighting fixture or small tool.

Once Universal Trol-E-Duct is on the job in your plant, there's no need for expensive rewiring, no matter what changes are required. Current is available through twist-out plugs or through trolleys that can be moved with the lights or tools. Either tap-off device can be removed and reinserted to serve any point along the duct.

And if major alterations call for radical changes in electrical distribution, Universal Trol-E-Duct can be dismantled, moved and reinstalled with *complete re-use of all material.*

You can learn more about this modern, efficient system by calling the nearest BullDog Field Engineer. He can give you full technical information and show you a BullDog installation near your own plant. Or, write BullDog direct and we'll send descriptive folders.

• • •

BullDog manufactures Vacu-Break Safety Switches—SafToFuse Panelboards—Superba and Rocker Type Lighting Panels—Switchboards—Circuit Master Breakers—"Lo-X" Feeder BUStribution DUCT—"Plug-in" Type BUStribution DUCT—Universal Trol-E-Duct for flexible lighting—Industrial Trol-E-Duct for portable tools, cranes, hoists.

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Mullenbach Electrical Manufacturing Co.
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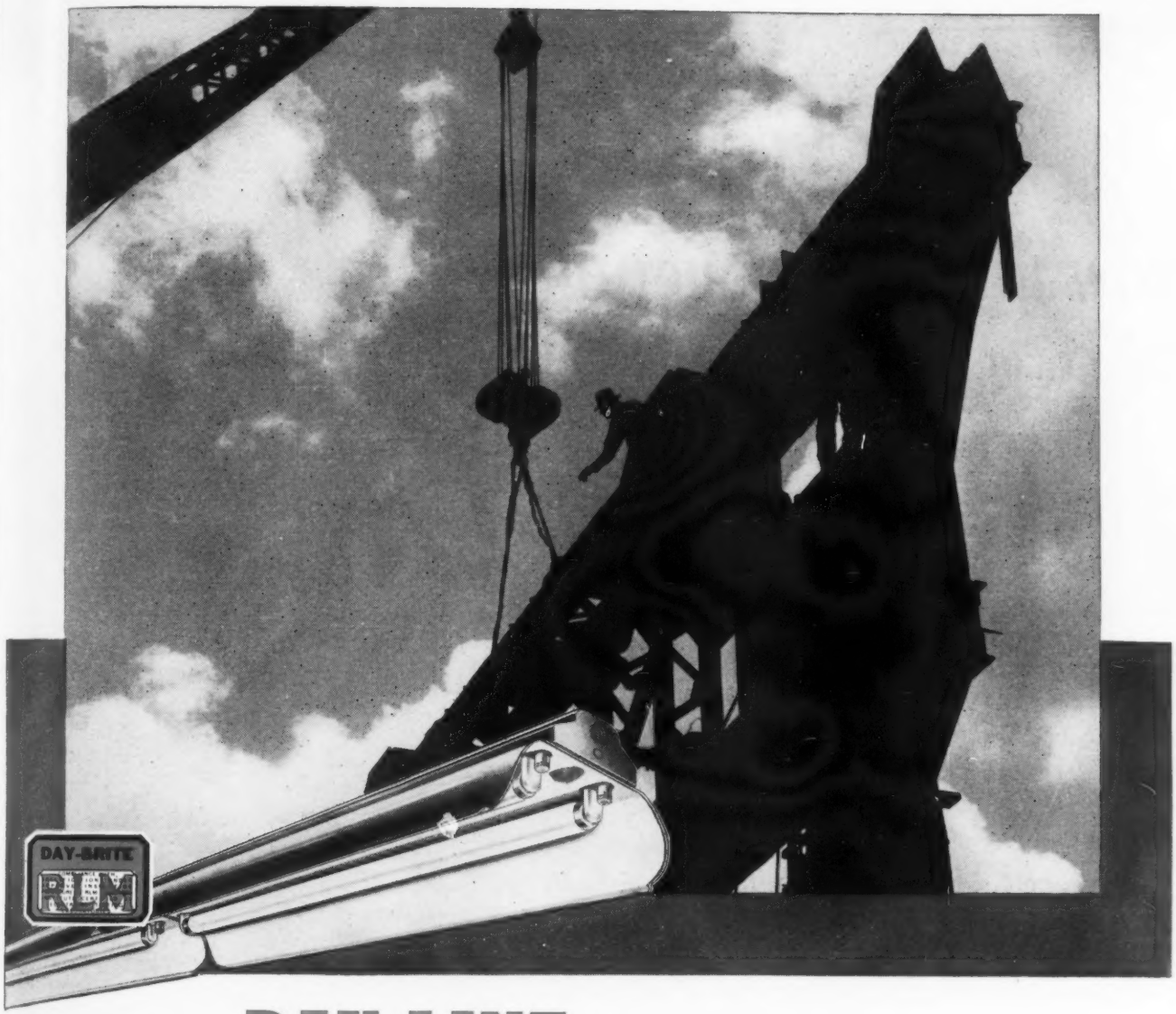

DAY-LINE...

Stress-Engineered Like a Bridge

Its truss-like channel is structurally designed to withstand years of vibration and rough handling. The heavy-duty DAY-LINE has strength to spare down to the smallest detail. That means you save substantially on upkeep. May we send Bulletin 30-A with complete details?

The DAY-LINE

Heavy duty industrial fluorescent fixture with porcelain-enameled steel reflectors. Designed for two and three 40- or two 100-watt lamps—unit or continuous installations. U. S. Patent Nos. 2317434, D-135375 and D-133458.

Day-Brite Lighting, Inc., 5412 Bulwer Avenue, St. Louis 7, Mo.
Nationally distributed through leading electrical supply houses.
In Canada: address all inquiries to Amalgamated Electric Corp., Ltd., Toronto 6, Ont.

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2nd INTERNATIONAL LIGHTING Exposition and conference
PLAN TODAY'S LIGHTING FOR TOMORROW
STEVENS HOTEL Chicago
NOV. 3-7 1947

IT'S EASY TO SEE WHEN IT'S
DAY-BRITE Lighting

1948 Line

NOW IN FULL PRODUCTION

Lamps For All Commercial Needs

Geared to full production to meet your customers' demands for better lamps for every purpose, the Faries 1948 line is now ready for your inspection.

Along with the regular Faries line, and time-proven staple numbers, you'll find all the latest developments in fluorescent and incandescent lighting, including new models built for use with "circline" fluorescent tubes.

The 1948 line includes lamps designed especially for offices, hotels, hospitals, clubs, factories, schools, institutions, and many other commercial applications.

Modern styling and awareness of eye-catching, sales-getting features make the new Faries line a retailers' favorite. Lamps are handsomely finished . . . and they're priced to meet competition in the quality field.

Send For
1948 Catalog
Showing Complete Line! ➔

Faries Manufacturing Co.
DECATUR, ILLINOIS
Since 1880

WESTERN OFFICE, 818 NORTH FAIRFAX, LOS ANGELES, CALIF.

here's the fixture that makes light...

Economical

EDUCATOR SERIES
300 A

Classrooms, too, deserve Planned Lighting, so LPI designers have developed a fluorescent fixture that meets the requirements of the best plans for the best lighting in schools. The LPI EDUCATOR is our new low-cost, high efficiency unit which offers planned lighting assistance to students and teachers. Let the Educator teach you how to get better school lighting at lower cost. Write for our complete catalog

LPI EDUCATOR
features:

2-40 and 2-100 fixtures with the same cross-sectional width for versatile combinations in continuous runs • Controlled light output—60% downward and 40% upward • No exposed horizontal surfaces to gather dust • Surface or pendent mounting • 35°-45° light cut-off • Heavy, prime steel finished in high temperature "Klasium White".

LPI

LIGHTING PRODUCTS, INC.

HIGHLAND PARK, ILLINOIS

"Certified" ON A BALLAST...

IS MORE THAN A WORD!

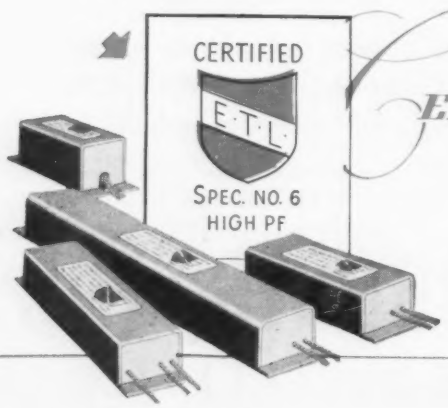
. . . Measuring Certified Ballast temperatures while ballast is operating in an actual fluorescent fixture.

Hot Box! Certified Ballasts are tested and checked against *overheating*. Test oven determines temperature rise.

Certified Ballasts are checked and rechecked in actual service—an additional safeguard for high quality.

When fluorescent lighting fixtures are equipped with Certified Ballasts, you and your customers are protected

CERTIFIED FLEUR-O-LIER MANUFACTURERS, RLM STANDARDS INSTITUTE and CERTIFIED LAMP MAKERS have solved their ballast problems by writing CERTIFIED BALLASTS into their specifications.



YES, "CERTIFIED" on a ballast means that this ballast has been built to exacting specifications set up by lighting experts . . . that it has been *tested, checked* and *CERTIFIED* by impartial Electrical Testing Laboratories, Inc. "Certified" further means ballasts that are *quiet* in operation . . . protected against overheating . . . and long lived. And they cost no more than any other ballasts!

Write today for new booklet, "The Story of Certified Ballasts."

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Makers of Certified Ballasts for Fluorescent Lighting Fixtures

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New Benjamin "Series 40's" Feature A.B.C. SIMPLICITY!

New Exclusive Benjamin "SPRINGLOX" LAMP HOLDER an advancement in Quick, Easy, SURE Lamp Insertion

Simplicity that keynotes new Benjamin "Series 40" Units . . . that makes them the "smart buy" in industrial fluorescent fixtures . . . is well exemplified in their "Springlox" Lamp Holders. Here is a one-piece, spring-action, metal clad lamp holder that makes lamp insertion or removal as simple as A.B.C.! One push, and the lamp is automatically positioned . . . easily, instantly, securely . . . without fussing, fumbling or forcing! It's patented, practically indestructible —**positive!**

There's welcome simplicity, too, in the easy-to-clean quality of their Lifetime Porcelain Enameled Reflectors; in their modern, clean-cut styling; in the easy attachment or removal of reflector from housing made possible by their new Benjamin "Lok-Latch"; and in their many other design refinements that combine to facilitate both installation and maintenance.

Yes, their simplicity alone makes Benjamin "Series 40" Units a wise choice. But you get far more! You get famous Benjamin built-like-a-battleship construction . . . porcelain enamel's unequaled retention of the reflection factor . . . conformance to all applicable RLM, electrical and other industry specifications . . . **highest quality illumination at lowest cost!** All of this adds up to this assurance: "You Light Right, When You Light With Benjamin"!

BENJAMIN
Lighting Equipment
Distributed Exclusively by Electrical Wholesalers

SEND FOR FREE BULLETIN ON "Series 40" TODAY!

BENJAMIN ELECTRIC MFG. CO.
Dept. J, Des Plaines, Illinois

Light ... THE WAY TO MODERNIZATION

"Something Better Has Come to Light" in distinctively styled, efficiently engineered lighting.

Practically, technically and creatively—standard Fluorescent and Incandescent Pittsburgh Permaflector Lighting Equipment can produce "custom designed results" in all types of interiors and exteriors.

A PERMAFLECTOR PORT
The Kleinhans Co.
Buffalo, N. Y.

USE PITTSBURGH PERMAFLECTOR LIGHTING EQUIPMENT

Pittsburgh Permaflector

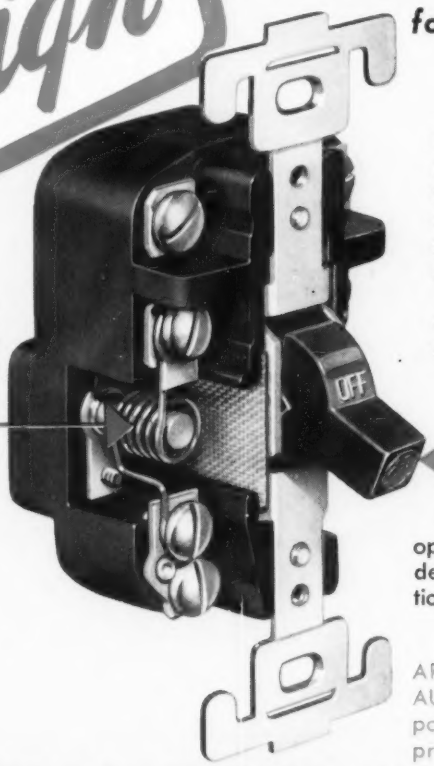
PITTSBURGH REFLECTOR COMPANY
OLIVER BUILDING · PITTSBURGH 22, PA.

MANUFACTURERS OF FLUORESCENT AND INCANDESCENT LIGHTING EQUIPMENT
DISTRIBUTED BY BETTER ELECTRICAL WHOLESALERS EVERYWHERE

New Design

A SMART-LOOKING STARTING SWITCH

for Motors of One Horsepower or Less

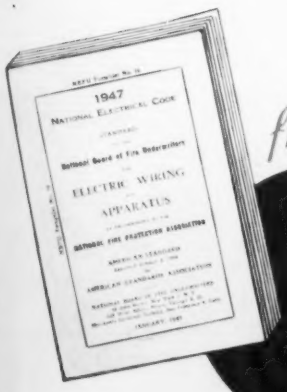


This popular manual starting switch has been redesigned . . . inside and out. Its attractive plastic enclosure harmonizes with the streamlined contours of modern appliances and machines. There is more wiring space . . . more accessible terminals . . . more protection for motor and operator.

Meet 1947 N.E.C. Code requirements with this new Bulletin 600 Switch . . . it is a sales asset to any motorized machine.

Overload device operates on "soldered ratchet" principle. Impossible to hold switch closed under sustained overload. Easily reset with switch lever after overload is cleared.

Bulletin 600 Starting Switch is a manually operated snap switch with thermal overload device. Essential for most small motor applications. See 1947 N.E.C. Ruling, below.



ARTICLE 4322-C: ONE HORSEPOWER OR LESS, AUTOMATICALLY STARTED. Any motor of one horsepower or less which is started automatically shall be protected against overcurrent.

from 1947 NATIONAL ELECTRICAL CODE:

ALLEN-BRADLEY

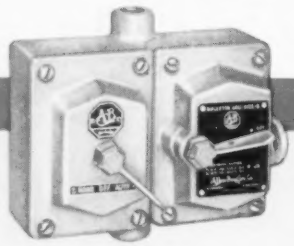
QUALITY

STARTING SWITCHES FOR SMALL MOTORS

See Next Page

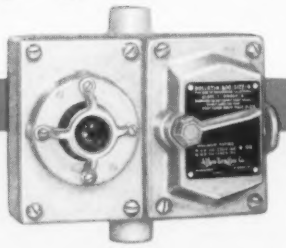
BULLETIN 600 Manual Starting Switches for Motors up to One Horsepower

Available in a Wide Variety of Forms and Enclosures



SELECTOR SWITCH
For 3-way "HAND-OFF AUTOMATIC" control. Selector switch on left; Bulletin 600 starting switch on right. Two-way units also available.

SAFETY SEAL
The cast iron enclosure of this Bulletin 600 starting switch has machined seal between cover and base for hazardous gas applications.



PILOT LIGHT
In this form, a red pilot light is combined with Bulletin 600 Switch in cast iron enclosure. For watertight or weatherproof pilot control service.

GENERAL PURPOSE
The plastic enclosure of this Bulletin 600 starting switch is in harmony with the streamlined appearance of the most modern equipment.

These Bulletin 600 Manual Starting Switches show some of the Allen-Bradley switching units extensively used for air-conditioning and refrigeration service.

OVERLOAD PROTECTION—In spite of their extreme compactness they provide accurate and dependable overload protection for motors under one horsepower. Thermal elements for the overload device are available in over three dozen ratings from 0.2 ampere to 12.7 amperes—for accurate overload protection. Meets all N.E.C. code requirements.

NO CONTACT MAINTENANCE—The silver alloy contacts require no cleaning, dressing, or filing, since any oxides that may form are good conductors. Low contact resistance is always assured. Just install these Allen-Bradley starting switches . . . and forget them.

MANUAL SWITCHES FOR MOTORS UP TO FIVE HORSEPOWER

For installations up to 5 hp, 220 v., 7½ hp, 440 v., use Bulletin 609 Manual Starting Switches. Provide accurate overload protection and years of trouble-free operation. Standard enclosures are available for every service.

This cast iron enclosure, with bolted machined covers, is for use in explosive atmospheres. Other standard Allen-Bradley enclosures are available.

Bulletin 609 Across-the-line Starters are operated mechanically with START and STOP buttons. Cannot be used for automatic control. For such installations, use Bulletin 709 Magnetic Starters with 2- or 3-wire control.

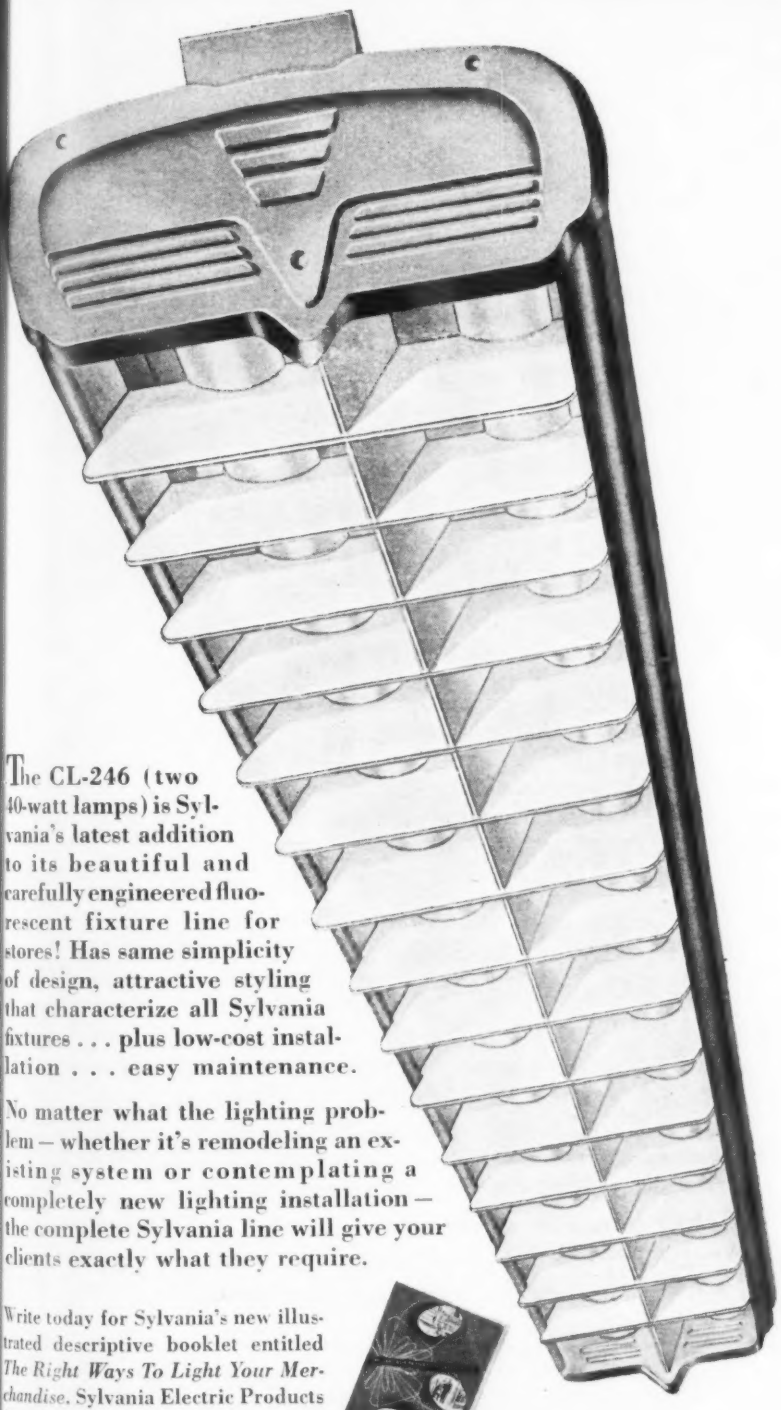
Bulletin 609 Manual Starter In flush type pressed steel enclosure is designed for flush mounting in machine housings. Makes attractive installation.

ALLEN-BRADLEY CO., 1316 S. Second St.
MILWAUKEE 4, WIS.

ALLEN-BRADLEY
STARTING SWITCHES FOR SMALL MOTORS
QUALITY

SEE OTHER SIDE

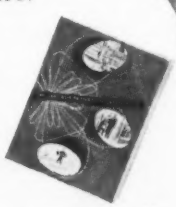
THE MOST COMPLETE LINE OF FLUORESCENT FIXTURES FOR STORES

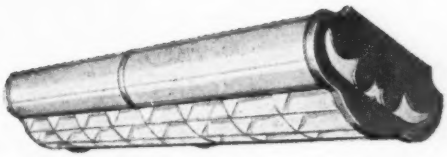


The CL-246 (two 40-watt lamps) is Sylvania's latest addition to its beautiful and carefully engineered fluorescent fixture line for stores! Has same simplicity of design, attractive styling that characterize all Sylvania fixtures . . . plus low-cost installation . . . easy maintenance.

No matter what the lighting problem — whether it's remodeling an existing system or contemplating a completely new lighting installation — the complete Sylvania line will give your clients exactly what they require.

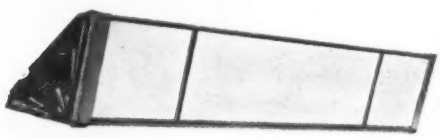
Write today for Sylvania's new illustrated descriptive booklet entitled *The Right Ways To Light Your Merchandise*. Sylvania Electric Products Inc., Lighting Division. 213 Derby St., Salem, Mass.





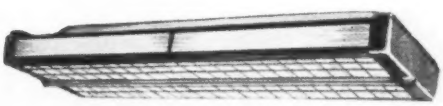
C-205 Complete with two 40-watt lamps. By pressing two fastening levers, the entire assembly swings down, providing a basket for lamps.

C-200 Ideal for grocery, variety and drug stores! Reflector is joined to top-housing with only 3 screws and can be removed without disturbing wiring, ballast, starters or lampholders.

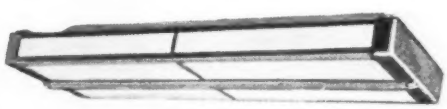


C-201 Glass-diffused; four 40-watt lamps. Fluted panels are hinged to end caps and swing outward or lift away from the fixture entirely.

C-440 Complete with four 40-watt unshielded lamps. The end caps snap open and swing down for easy lamp or starter replacement.



CL-440 The shield assembly of this louvered version of C-440 hinges downward and may be completely removed for easy cleaning.



CG-440 Equipped with glass diffusing panels, this four 40-watt fluorescent fixture combines low fixture brightness with high light output and efficiency.

"Fluorescent at its Finest"
FOR STORE, OFFICE, FACTORY, HOME

WEST COAST DIVISION OFFICES

210 West 7th St.
Los Angeles 13, Cal.

111 Sutter St.
San Francisco 4, Cal.

951 White-Henry-Stuart Bldg.
Seattle 1, Wash.

SYLVANIA ELECTRIC

Complete technical data on Federal Standard Cold Cathode lighting fixtures and lamps is now available to engineers, architects, designers—everyone planning improved lighting.

Federal Electric Company is the first in the industry to provide complete factual data for installation and performance of Standard Cold Cathode lighting units. This data has been published in convenient folder form to assist you in computing lighting installations. The data covers Federal's complete fixture line.

OTHER FEDERAL FIRSTS

FIRST to design completely modern functional fixture units (25 types available).

FIRST to develop automatic lamp processing equipment for manufacture of reliable Cold Cathode lamps.

FIRST to standardize the trouble-free positive contact pin base for Cold Cathod lamps, obsoleting the ferrule-type carried over from the neon sign type of lighting.

FIRST to provide a safe socket—approved by Underwriters for residential use.

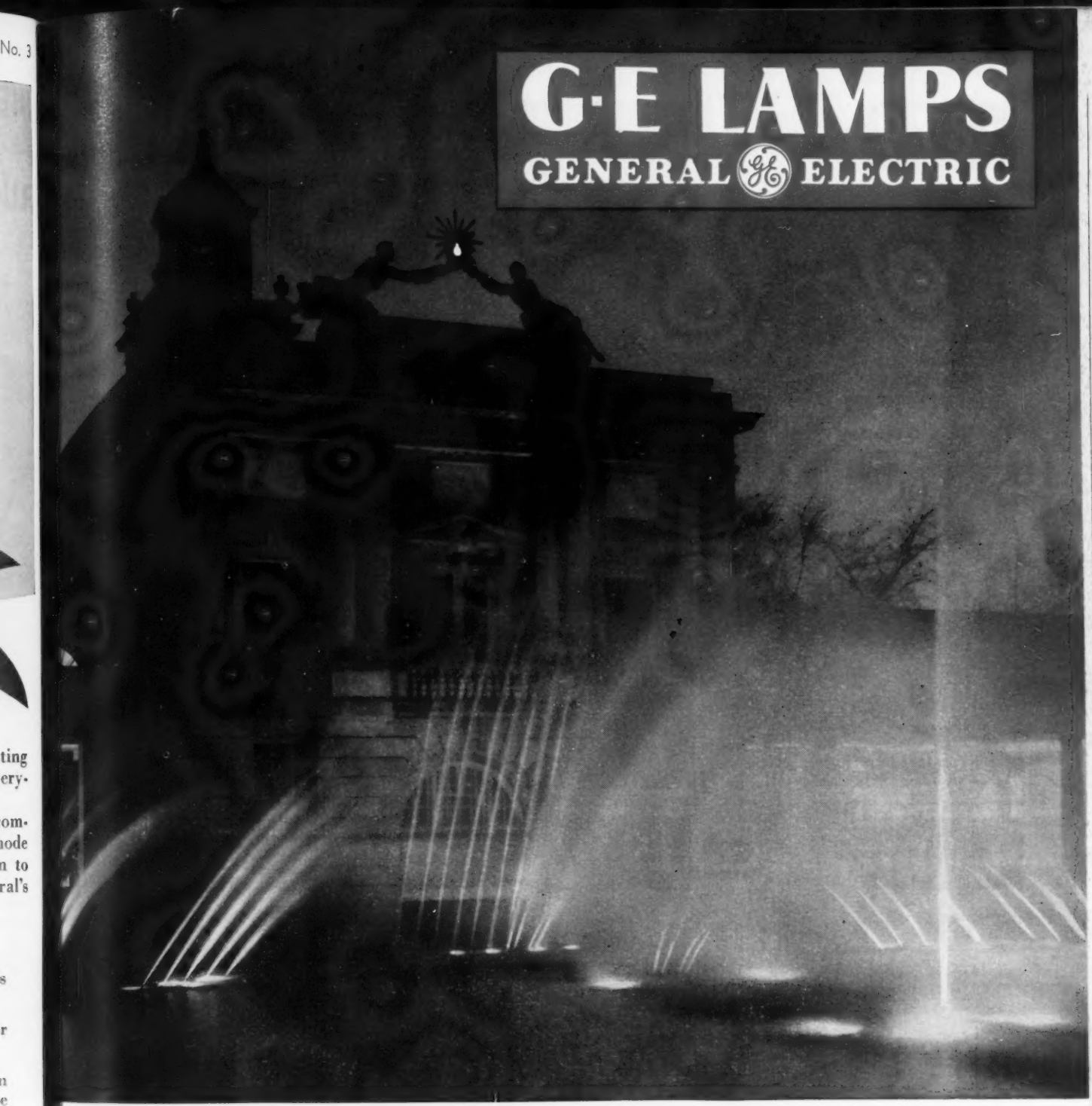
FIRST to provide complete engineering service.

Your FREE COPY

has been reserved—write today for Federal Cold Cathode Fluorescent Lighting Technical Bulletin 116.

FEDERAL ELECTRIC COMPANY, Inc.

8700 SOUTH STATE STREET · CHICAGO 19, ILLINOIS



How long is 25 "light years"?

AN astronomer would give you an astronomical answer. But from the electric utility point of view, 25 "light years" is a fitting way to describe the quarter century just past . . . a period packed with new developments in lamps and lighting equipment which have greatly expanded the industry's opportunity for service to power consumers.

Throughout these 25 eventful years, the General Electric Lighting Institute at Nela Park has served as America's show-place for improved illumination techniques. Now that's truer than ever. The *new* Institute presents an up-to-the-minute array of exhibits and lighting demonstrations, combined with practical courses in commercial, industrial and home lighting.

Remember...this is *your* Institute! We invite utilities to make arrangements with any G-E Lamp office to send their key men to this "University of Light" for fresh inspiration and new ideas. There are even better "light years" ahead. Let General Electric help you prepare for them now!

LIGHT *years are* LAMP *years!*

SEE G.E.'S CALENDAR OF LAMP PROGRESS ON THE FOLLOWING PAGES . . . .

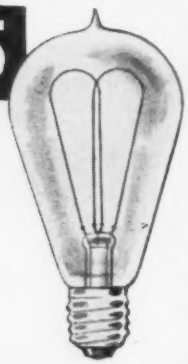
Some Highlights from the record of G-E lamp research

Since the early days of the incandescent lamp, it has been the persistent aim of General Electric Lamp Research to cooperate fully with the electrical industry in giving the consumer *more and more light for his money.* Constant manufacturing improvements have increased lamp efficiency year after year. It is significant that a great majority of lamp improvements have consistently originated at General Electric.

1879

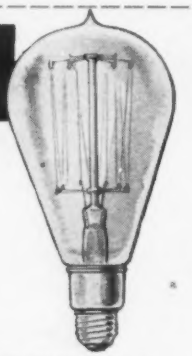
EDISON'S FIRST LAMP—The first practical incandescent light bulb. Produced 1.4 lumens per watt.

1905



GEM LAMP—Filament treated in electric furnace. 25% higher efficiency than ordinary carbon lamps.

1911

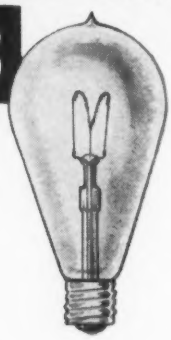


DUCTILE TUNGSTEN FILAMENT—First rugged metal filament, making possible more efficient sources of diversified form for every lighting purpose.

1912

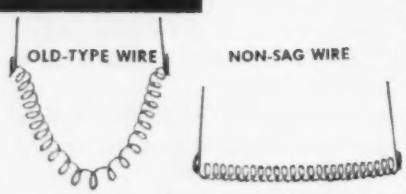
NEW CHEMICAL "GETTERS"—Reduced bulb blackening, making possible smaller size bulbs for any given wattage.

1913



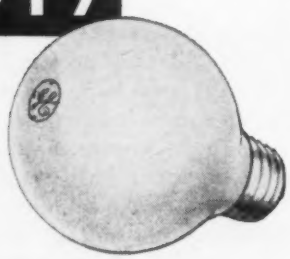
GAS-FILLED LAMP—Major increase in efficiency, particularly in high-wattage lamps.

1915



NONSAG WIRE—Kept close-pitch filament coils from stretching and shorting. Better maintenance of efficiency.

1919

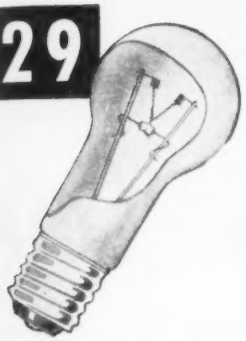


TIPLESS LAMP—Eliminated tip breakage, and improved lamp appearance.

1925

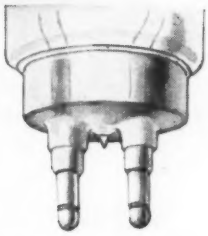
INSIDE FROSTED LAMP—A smooth bulb diffusing light with negligible loss in output.

1929



S-1 SUNLAMP—For the first time, the health benefits of Vitamin D producing ultraviolet rays from a screw-base bulb.

1932

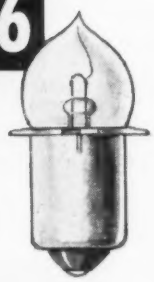


BIPOST LAMPS—Radically new. More rugged construction. Inherently prefocusing.

1934

HIGH PRESSURE MERCURY LAMPS—High-efficiency industrial illumination, permitting the use of fewer light sources.

1936



PREFOCUS FLASHLIGHT LAMP—Doubles flashlight candlepower and insures uniform spot.

1937

COILED-COIL FILAMENT—First strong lamp of this more efficient type.

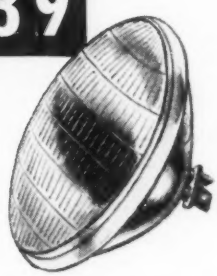
1938

FLUORESCENT LAMP—A revolutionary lamp development. "Cold light" of radically higher efficiency.

1938

HOT CATHODE GERMICIDAL LAMP—Germ-killing radiant energy at highest efficiency and lowest cost.

1939



ALL-GLASS SEALED BEAM HEADLAMP—Revolutionized automotive headlighting. Hard glass reflector and lens fused together constitute the bulb.

1942

HIGH-IMPACT, SHOCKPROOF LAMP—Withstands terrific shock. An important factor in keeping naval ships in action during World War II.

1945

CIRCLINE AND SLIMLINE FLUORESCENT LAMPS New forms of standard fluorescent lamps particularly adapted to the needs of architect and designer.

1947

. . . General Electric Lamp research continues to work with a single aim in mind—to make G-E lamps

Stay Brighter Longer!

Whatever lamps you need

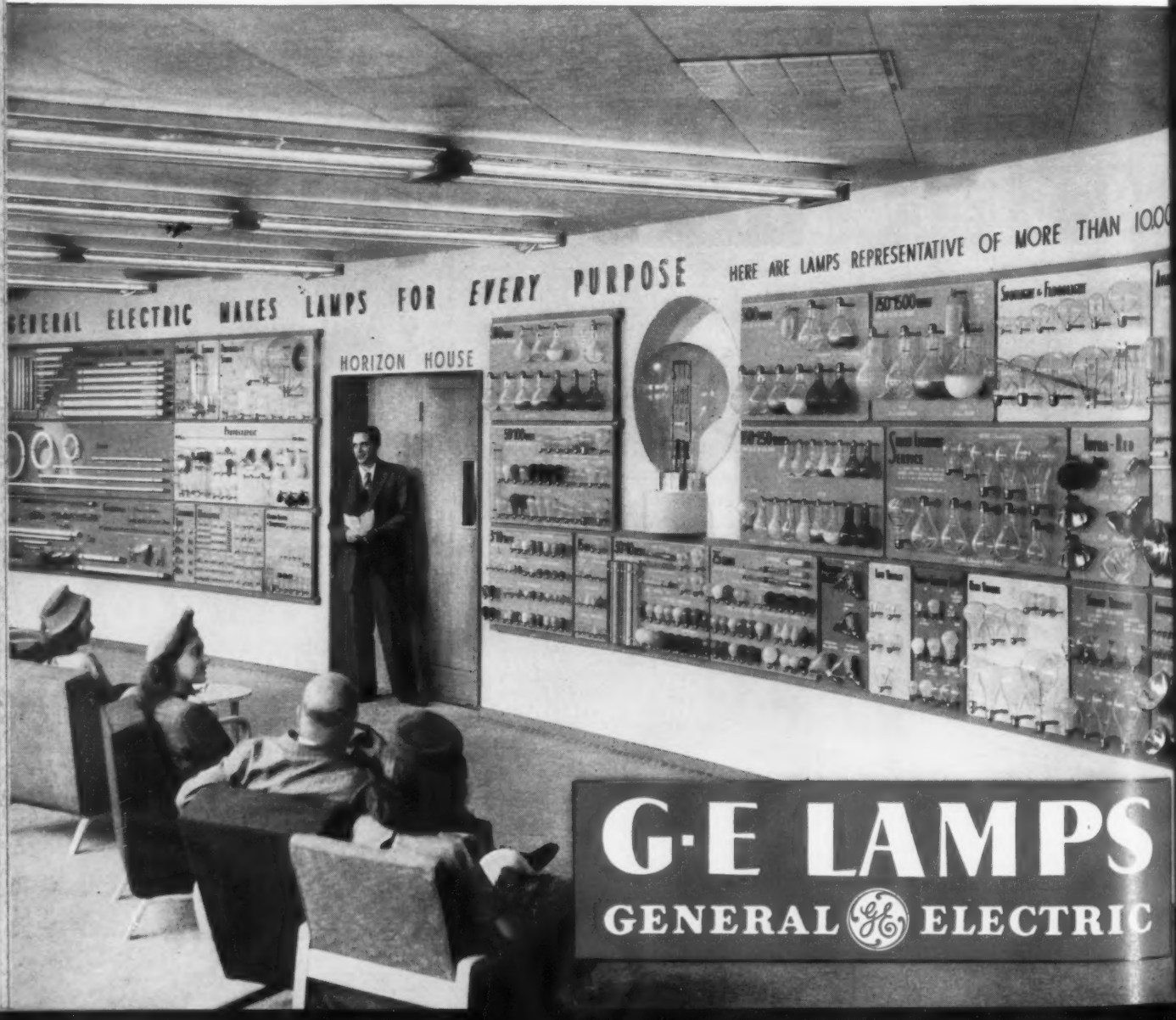
TO BUILD YOUR PROFIT LOAD

G.E. makes 'em all!

Utility men often speak of lighting as the real "profit load" because it's steady, easy to handle — and offers the most promising possibilities for future expansion. General Electric makes more than 10,000 different types and sizes of lamps to serve completely every type of consumer on your lines. Our engineers are ready to work with your lighting specialists to make G-E lamps even more profitable load builders in your area.

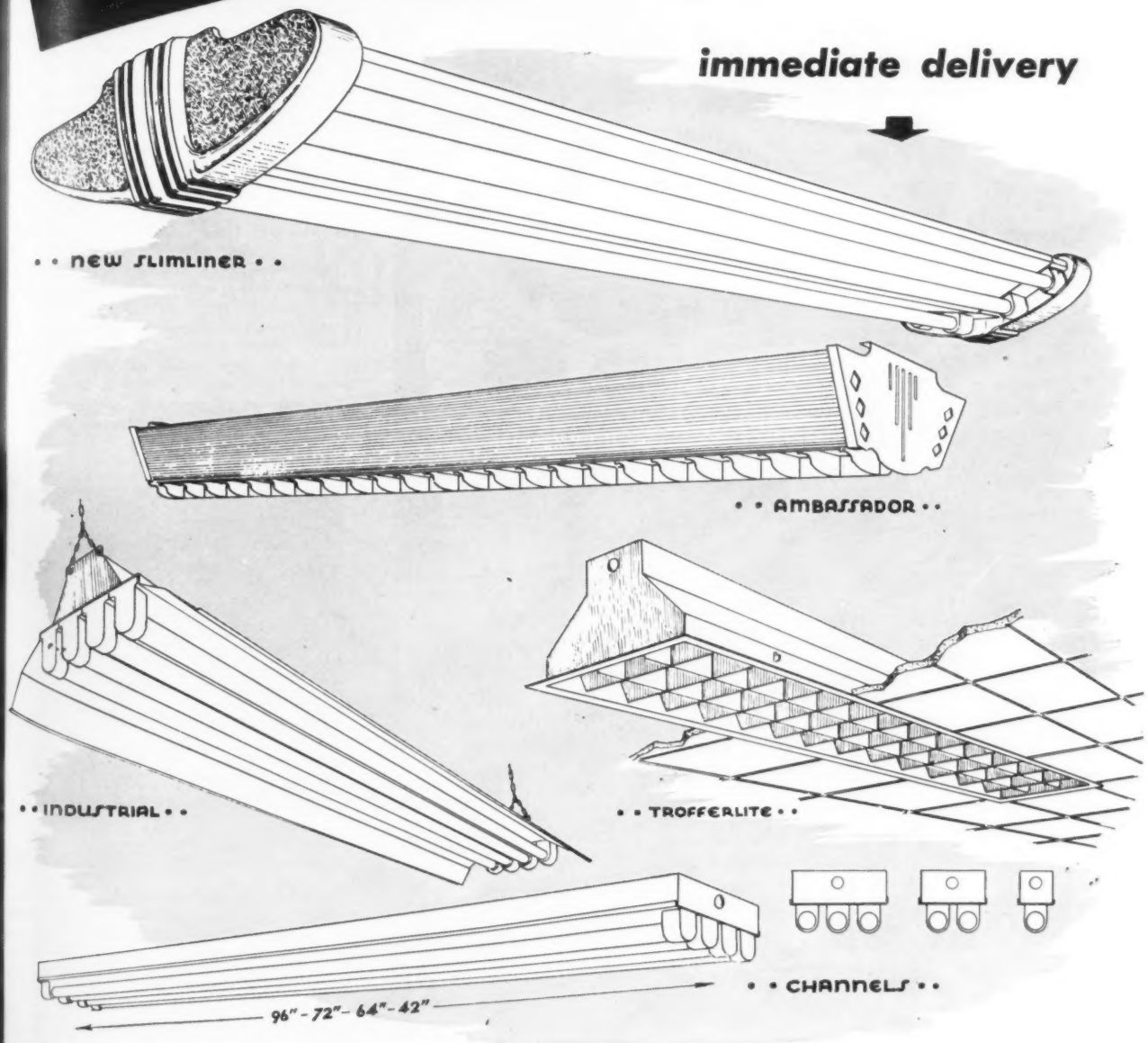
No lighting job can be better than its lamps. You can count on G-E Research to lead the way with an ever-increasing line of high quality lamps for all purposes.

For complete information on G-E lamps for any field of application, call your nearby G-E Lamp office. Or write General Electric Company, Lamp Department, Nela Park, Cleveland 12, Ohio.


GENERAL ELECTRIC MAKES LAMPS FOR EVERY PURPOSE
HERE ARE LAMPS REPRESENTATIVE OF MORE THAN 10,0
HORIZON HOUSE
G·E LAMPS
GENERAL ELECTRIC

All-Brite leads in SLIMLINE

immediate delivery



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"ALL-BRITE" Fixtures

MORE LIGHT on Outdoor Living

IN THE HOME

Smoot-Holman lighting is filling ever greater needs in today's trend toward better living. Architects and home builders are planning patios and garden spots for exterior living space in every home. Smoot-Holman Outdoor Lighting Equipment doubles their usefulness by providing efficient, comfortable lighting for any desired area.

FOR SPORTS

From croquet and back-yard badminton to tournament tennis, Smoot-Holman Outdoor Lighting provides the means to extend the usefulness of recreation areas far into evening hours. Certified Smoot-Holman lighting equipment distributes light evenly, without glare—for home, playground, office, store or factory.

SMOOT-HOLMAN COMPANY

SMOOT-HOLMAN

INGLEWOOD, CALIFORNIA

MADE IN U.S.A.

Offices in Principal Western Cities

Branch and Warehouse in San Francisco

FOR THE BEST IN INDOOR AND OUTDOOR LIGHTING IT'S SMOOT-HOLMAN

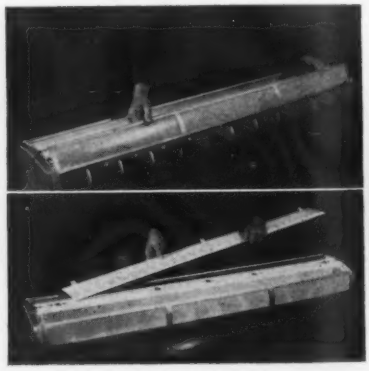
PRODUCT NEWS

Conversion Set (900)

Sylvania Electric Products is marketing a conversion set to transform unshielded fluorescent fixtures to shielded models. Packed as a complete unit, this set allows for flexibility in appearance, consists of a shield frame assembly, glass panels or louvers, retaining clips, joint covers and mounting hook or bracket, with necessary hardware. With this set, catalogued CG-DA, the consumer or dealer can convert a bare lamp C-240 or C-440 Sylvania fixture into either a glass shielded or louvered model.

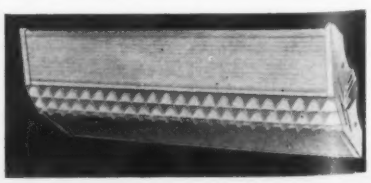
Semi-Direct Unit (901)

The redesigned Wakefield Grenadier 2 lamp semi-direct unit has increased shielding of 35° parallel to the lamps and 25° normal to the lamps. Removable side panels and louvers; heavier-gage metal, white plastic side panels, new finish are other improvements. The downward component of illumination may be increased by accessory opaque reflectors or by slotted reflectors placed immediately above the lamps.



Commercial F Line (902)

Bright Light Reflector Co. has introduced the first in a new line of Silv-A-King commercial fluorescent luminaires. This new unit, the Vanguard, is a 4-lamp, 40-watt fixture, with glass side panels to open and plumb themselves. Slotted end-sections are fitted with glass panels to permit a soft glow. Designed for either suspension or surface mounting, single units or continuous rows; available with canopy and stems if desired.



Green F Lamp (903)

Certified Electric Corp. has announced the Emeralescent fluorescent lamp, emitting a green light. These lamps come in 20- and 40-watt sizes.

Here's the Latest

NAME OF MANUFACTURER
COMPLIANCE WITH SPECIFICATIONS UNDER APPROVED INSPECTION PROCEDURE OF RLM STANDARDS INSTITUTE CERTIFIED BY ELECTRICAL TESTING LABORATORIES, INC.

Data on Industrial Lighting for Men who Specify, Buy or Sell INDUSTRIAL LIGHTING EQUIPMENT

New RLM SPECIFICATIONS Covering 14 Different Types of Reflectors and Fluorescent Units

All RLM Standard Specifications have been completely revised to include the latest technical developments.

Whether you specify, sell or buy industrial lighting equipment, these new RLM Specifications will prove helpful in measuring construction and performance factors vital to safety, lighting efficiency and economy.

In drafting these new RLM Specifications, the Technical Committee has been guided by the latest findings of the Illuminating Engineering Society, and the recommendations of other recognized industry associations. That is but one of numerous steps taken by RLM Standards Institute to make sure that any Incandescent or Fluorescent lighting equipment bearing the RLM LABEL will provide maximum satisfaction.

These new RLM Specifications are now available in a convenient booklet. A copy is yours for the asking from manufacturers utilizing RLM inspection and certification service, or direct from RLM Standards Institute.

RLM STANDARDS INSTITUTE INCORPORATED

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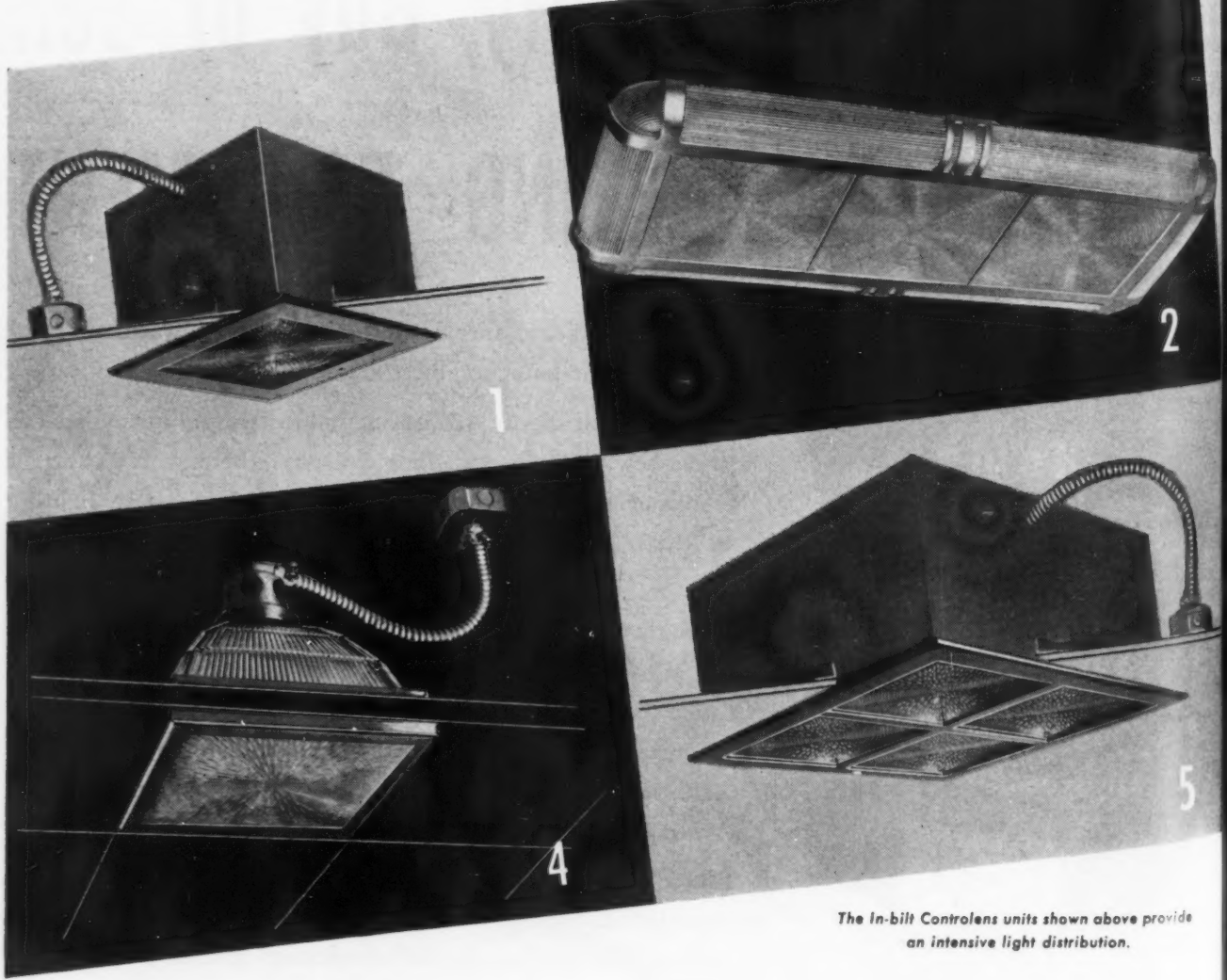
HOLOPHANE

IN-BILT



The In-bilt Controlens units shown above provide an intensive light distribution.

1 **Single flush unit.** Square-lens-square-reflector (basic optics for all except #6.) 12" or 8½" square lenses contained in metal housing for any building construction.

2 **Decorative drop-trim units.** Single and multiple types. Ceiling illumination through ribbed glass side panels. 12" lenses. May be alternately equipped for accent lighting.

3 **No-Box type,** modification of #1. Single flush units. Square-lens-square-reflector with 12" or 8½" square lenses. Affords substantial savings in fire-resistant buildings.

4 **For acoustical tile ceilings.** Modification of #3. Flush units, single or multiple types. 11" square lens.

5 **Multiple flush units** (four-square as above and 2 or more in-line). Lenses and reflectors are 12" square. In metal housing.

6 **Flush unit No-Box type.** Round-reflector-round-lens, 13½" diameter. Employ where round shape is architecturally indicated.

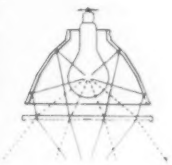
PRODUCTS OF HOLOPHANE RESEARCH

INCANDESCENT*

This matched "Optical-Train" meets over 85% of today's IN-BILT lighting requirements

For general lighting applications, where it is desirable to secure uniform illumination from regular grid spacings up to 1¼ times the mounting height, Holophane offers the exclusive double-action Controlenses. On superficial examination they may resemble other lens types, however their performance for general lighting purposes is far superior.

Observe from the sketch their ability to accept light rays, at the same point on the lens that approach from equally opposite directions, and then to diverge them in an equally opposite amount.



The ultimate refinement resides in the matching of forms: square prismatic reflectors with square prismatic lenses; round reflectors with round lenses. This results in uniform brightness over the entire surface of the lighted unit.

Consider these cumulative advantages from the use of Holophane IN-BILT Controlens Systems: **A.** highest illumination values from any built-in system . . . **B.** crystal prismatic glass transmits the light unmodified and undistorted . . . **C.** glass control surfaces impervious to chemical change; ordinary washing solutions restore them to initial efficiency . . . **D.** low cost per-footcandle-per-year because of better maintenance due to enclosed construction . . . **E.** artificial lighting in the natural manner; this method comes nearest to letting in the sky . . . **F.** last word in the art of lighting; interiors appear clean, orderly, spacious.

Consult Holophane Engineering Service

The family of Holophane In-Bilt Controlens units is more extensive than space permits us to show and describe here. Actually, the combination of optical arrangements and lighting effects which can be secured with prismatic Controlens systems are nearly inexhaustible . . . Engineering data is available from which you can design the average job. If your lighting project requires a technique which is not readily apparent, the services of our Engineering Department are at your disposal.

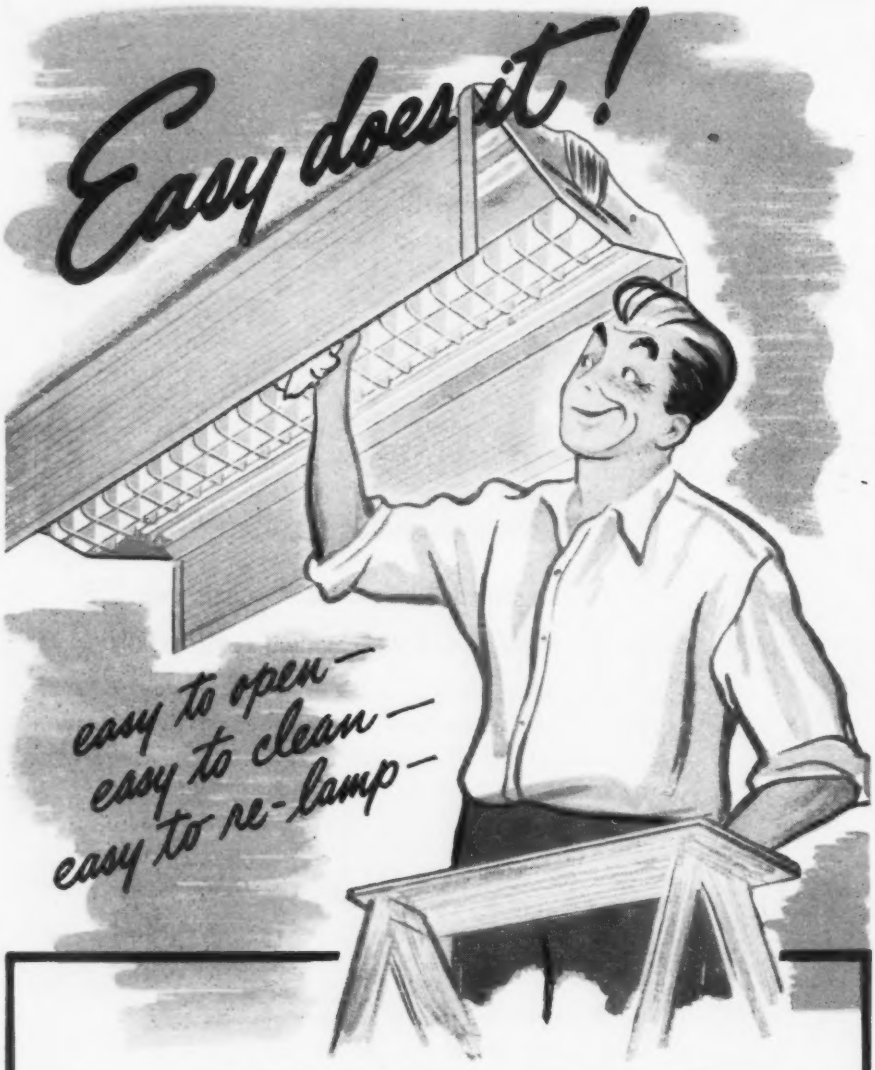
Holophane
Trade Mark

HOLOPHANE COMPANY, INC.

Lighting Authorities Since 1898 • 342 MADISON AVENUE, NEW YORK 17, N. Y.

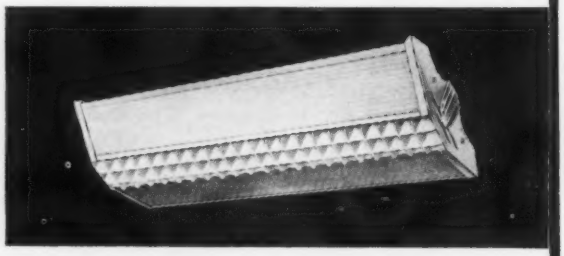
THE HOLOPHANE COMPANY, LTD., THE QUEENSWAY, TORONTO 14, ONTARIO

Pacific Coast Representatives:—R. G. Dummel, San Francisco; F. van Gilluwe, Los Angeles
Distributors, General Electric Supply Corp.



The VANGUARD

Newest SILV-A-KING Fluorescent Fixture . . . for commercial installations



No more dangerous high-ladder gymnastics . . . no more fancy tools . . . no more lacerated fingers or strong language! The Vanguard opens as easily, quickly, and safely as your fountain pen—for inspection, cleaning, or re-lamping.

For assurance of minimum maintenance time . . . Specify the Vanguard!

I. B. E. W., A. F. of L. • Listed by Underwriters' Laboratories, Inc.

Yours for the asking, "Vanguard" Bulletin No. 447FV

SILV-A-KING LIGHTING EQUIPMENT

BRIGHT LIGHT REFLECTOR COMPANY, INC.

Subsidiary of Bridgeport Pressed Steel Corp.

FAIRFIELD AT STATE • BRIDGEPORT 5, CONN.

Recessed Spotlight (904)

To help reduce stock requirements, Associated Lighting Service has developed fixtures with standardized recessed can and interchangeable bayonet-locked face plates to fit several lighting needs. These fixtures go under the trade name Westlite, and belong to a group of recessed units called Accentlites using the R-40 reflector lamps. According to the announcement, complete flexibility of beam control is made possible by a built-in quadrant yoke to permit beam direction vertically up or down to an angle of 30°. The yoke is mounted on a swivel for a full circle swing of 360°.

No. 0102 has a concave face plate with the face of the lamp fitting the center hole. Lamp is always in full sight, but full spread of beam is available if flood lamp is used.

No. 0103 has a face plate with two rings mounted like the gimbals of a compass. The

center ring contains concentric louvers with provision for mounting glass filters for color control.

No. 0106 has a face plate in which is mounted a set of parallel louvers that can be revolved freely to match the angular adjustment of the beam.

All circular units have an aluminum casting with special pins so that the face plates can be bayonet-locked into position with a half-inch twist.

The square-lens units are constructed in a different manner but also conceal the method of holding the face plate. In these units the lens is mounted in the face plate with holding brackets that permit a small amount of vertical play. To remove the face plate the lens is pressed upward, a screwdriver is inserted in the resulting side openings and two locking screws are removed allowing the frame to drop on a safety hinge.

Path Light (905)

Cannon Electric Development Co.'s Pathfinder light is designed for use along paths, driveways, steps, etc., where illumination is required in moderate volume. The assembly consists of a lighting unit, riser conduit and a canopy base with outlet box, having 7-in. spike. The conduit is not included in the standard equipment. The 3x3-in. cylindrical lighting unit consists of an aluminum cap, lens socket and yoke section over a socket tube. Crystal polystyrene lens of seven prisms is standard, though various combinations may be made with amber, green, red and blue, including split lens. Light unit is furnished for low voltage or standard 100-volt circuits.

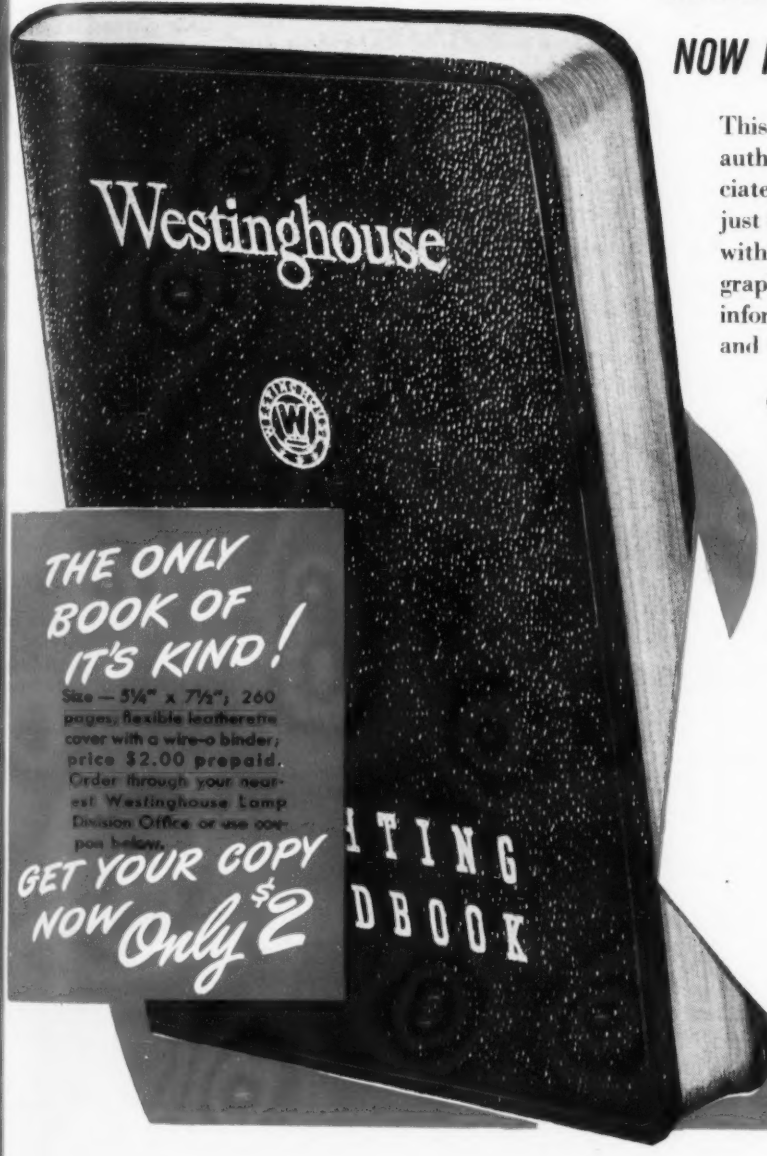
Germicidal Unit (906)

A Silv-A-King germicidal unit has been announced by Bright Light Reflector Co. and is available in two sizes, one for a 15-watt lamp, the other for a 30-watt lamp, both with 8 ft. cord and plug.

THE FAMOUS Westinghouse

LIGHTING HANDBOOK

NOW REVISED AND ENLARGED!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GET YOUR COPY NOW Only $2

This new, up-to-date Lighting Handbook, an authoritative reference work for anyone associated with engineered lighting installations, is just off the press! Contains 260 pages crammed with valuable technical data—wiring diagrams, graphs, line drawings, charts and tables, plus information on related subjects such as the eye and vision, color, and lighting terminology.

COMPLETE INFORMATION FOR ILLUMINATING ENGINEERS, DESIGNERS, ARCHITECTS, CONTRACTORS AND SALESMEN

Just look at this all-inclusive table of contents:

- The Eye and Vision
- Light Characteristics and Measurements
- Light Sources
- Introduction to Lighting Design
- Illumination Levels
- Interior Lighting Design
- Interior Wiring for Lighting
- Store, Office, School and Public Building Lighting
- Industrial Lighting
- Architectural Lighting
- Floodlighting Design
- Street Lighting
- Aerodrome and Airway Lighting
- Sign Lighting
- The Cost of Lighting

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something NEW in tool belts

PATENT APPLIED FOR

"KLEIN-LINE" TOOL BELT with the sliding trace

The "Klein Line" Tool Belt—new in design—provides increased comfort and convenience and a maximum factor of safety to the lineman.

The distinctive feature of this new belt is the Sliding Trace. Made of "Klein-Kord" (the same proved material used in our safety straps), the Sliding Trace is mounted on the cushion and carries the drop-forged tested single bar Dee rings. The trace slides freely through alloy steel guides, allowing movement of approximately 6 inches in either direction. Thus, the lineman is relieved of chafing often caused by conventional belts, and undue safety strap wear is prevented.

Other construction features of the new "Klein-Line" Belt include: 2-inch wide heavy harness leather belt strap with drop-forged buckle; 1-inch wide harness leather tool loop strap securely riveted to the main strap; and 4½-inch wide cushion of pliable latigo leather with rolled edges and canvas interlining. All sewing is lock stitched with hot waxed linen thread—all rivets solid copper hand set. Furnished complete with plier pocket, tape thong and knife snap.

Ask Your Supplier

Foreign Distributor: International Standard Electric Corp., New York

A copy of the Klein Pocket Tool Guide, showing the Klein line and containing valuable tool information, will be sent on request.

KLEIN TOOLS EST. 1857 TRADE-MARK REG.

Mathias KLEIN & Sons
Established 1857 Chicago, Ill., U.S.A.
3200 BELMONT AVENUE, CHICAGO 18, ILLINOIS

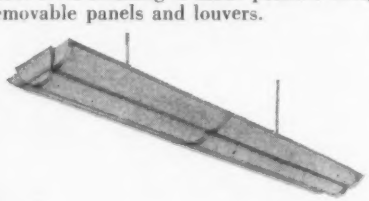
Semi-Circular F Lamp (907)

A semi-circular fluorescent lamp made by Westinghouse is reported to provide more light than a 50-watt incandescent but to consume only about one-third the power. Called "Circlarc," the new lamp is designed particularly for table and floor lamps, wall and ceiling fixtures and merchandising displays. It is an 18-watt tube curved to form a half circle 12 in. in diameter. It has a useful life expectancy of 2,500 hours at three hours average burning for each start. A two-pin plastic base at each end of the lamp connects it to the electric current. The base pins are located 45° to the plane of the lamp to allow the pins of the two opposing lamps to overlap and reduce the thickness of the two-lamp holder to a minimum. According to the manufacturer, the Circlarc plus its ballast will sell for about one-third the price of the circular fluorescent lamp and its ballast.

Fluorescent Line (908)

Allen and Olsen Mfg. Co., recently established in Los Angeles, has announced its first two luminaires—the 4041 and the 3041. Both are 4-light, 96-in. slimline, 200-milliampere units; are constructed of aluminum and plastic. The former is adapted to store lighting, has plastic side panels and louvers, the louver strips permitting a 15% light

transmission for over-all glow; designed for individual or end-to-end mounting, ceiling or stem suspension. The 3044 is a semi-indirect luminaire with plastic shielding. Light transmission, according to the announcement, is held to 35% in the zero to 90° hemisphere, surface brightness below 300 ft.-lamberts. Floor-level cleaning is made possible through removable panels and louvers.



Heater (909)

LaSalle Lighting Products and Markel Electric Products have announced Series 230 built-in wall Fan-Flo Heetaire, a recessed wall heater producing infrared rays and fan-forced heated air. These units are built with two switches, so that one element and fan may be shut off if desired. Models come in 2,000, 1,500 and 1,250 watts, all either at 230 or 115 volts. Motor is induction type for 50-60 cycles; a-c only.

Ballasts (910)

Slimline design ballasts for operation of two 40-watt hot-cathode lamps at standard ratings of .39 to .43 amp. are being manufactured by Advance Transformer Co. They have been approved by Electrical Testing Laboratories and are designed to meet needs for approved ballasts with streamlined dimensions, the manufacturer states.

SUNBEAM LIGHTING COMPANY

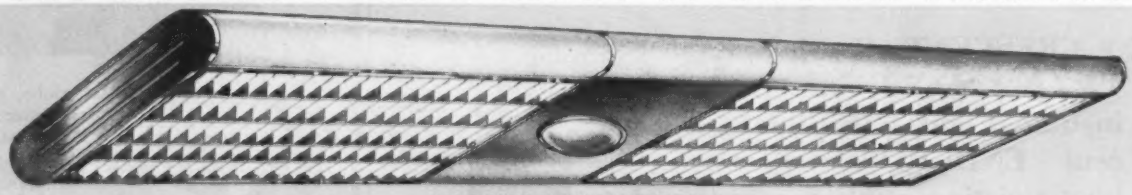
Announcing

SUNBEAM LIGHTING COMPANY

SUNBEAM'S COMPLETE NEW ADVANCED LINE OF FLUORESCENT LIGHTING FIXTURES

Sold Only Thru Leading Electrical Jobbers

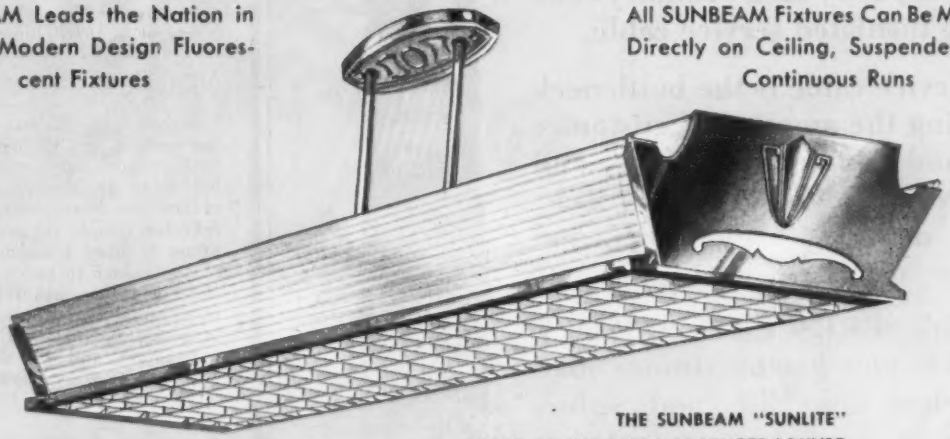
THE ANSWER TO THE NEEDS OF MODERN LIGHTING



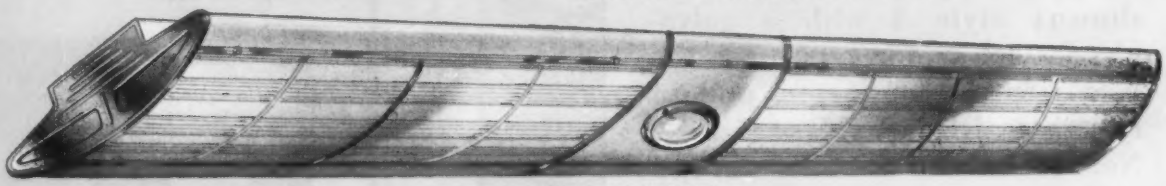
THE SUNBEAM "PRESIDENT"
1504-48 AND 1504-S CONTINUOUS RUNS.

SUNBEAM Leads the Nation in Perfect Modern Design Fluorescent Fixtures

All SUNBEAM Fixtures Can Be Mounted Directly on Ceiling, Suspended or in Continuous Runs



THE SUNBEAM "SUNLITE"
L6002-48 AND L6004-48 HINGED LOUVRE



THE SUNBEAM "STREAMLINER"
4003-48 OR 4004-48 WITH 4000-S SPOT. CONTINUOUS RUNS.

There Is a Sunbeam Fluorescent Fixture for Every Purpose — Ask Your Jobber for a Catalogue of Our Complete Line

DESIGNERS AND MANUFACTURERS OF

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Heat Resisting Insulation

• **CRESCENT Service Cables, sizes No. 6 AWG and larger, are insulated with a Type RH, Crescent ENDURITE super-aging, heat-resisting rubber compound of the best grade obtainable that gives *20% greater current carrying capacity* than ordinary code grade insulated service cable.**

• **Service cable is the bottleneck limiting the amount of customer demand for all appliances, and future business for the contractors, dealers, wholesalers and power suppliers.**

• **With CRESCENT SERVICE CABLE you get maximum load capacity, long life and value. Made in Type SE, Style U, as shown; Style A with a galvanized steel armor tape over the bare neutral conductor, and in type SD, Drop Cable. Sizes—No. 12 to No. 2 AWG in two and three conductors.**

Available through Electrical Wholesalers

CRESCENT
WIRE AND CABLE

CRESCENT INSULATED WIRE & CABLE CO.
TRENTON, N. J.

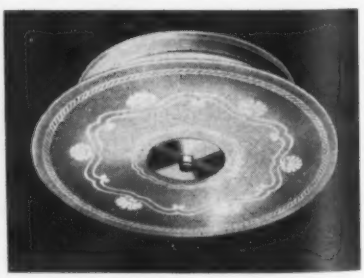
Street Light Globe (911)

A holophane prismatic globe, claimed to be the largest bowl refractor ever produced, is being made by G-E. It is stated that, combined with G-E's Form 79 and Form 101 casings and reflectors, the globe will place as much as 43% more light on the street than the reflector-type luminaire. Factors in its application are minimum street width of 60 ft.; need for large-sized lamps; desirability of 0.8 ft.-candles or more; economies of maximum spacing. The globe will take 10,000- or 15,000-lumen filament lamps or a 16,000-lumen mercury lamp.

Display Unit (912)

Steber Mfg. Co. has a new display lighting unit, called Utilite No. 1. Adapted for both indoor and outdoor service, the unit holder is an aluminum casting finned to radiate the heat generated by projector or reflector lamps. A gasket of flexible Neoprene is fitted permanently into the mouth of the holder to make a watertight connection. The base has rubber bumpers which may be removed when the unit is permanently mounted. Adjustments of 360 deg. horizontally and 180 deg. vertically are secured in fixed position by a hand-operated set screw. Listed by Underwriters'.

Shielded F Fixture (913)



Moe-Bridges has introduced a fluorescent shielded fixture utilizing the 32-watt circline lamp. This unit may be used as a ceiling fixture in the home or as a wall bracket in commercial establishments.

Hood-Shade Units (914)

A new line of adjustable screw-in hood-shade lighting units is available from Swivelier Co. The hood shades will accommodate up to a 300-watt Mazda-type R-40 bulb and come with or without removable louvers. In addition to the standard screw-in type, these units come with screw-in extension pipes in 5-, 8-, and 11-in. lengths.

Save Time AND *Money!*

INSTANT CLEANING!
INSTANT STARTING!
INSTANT RELAMPING!

with

Guth FLOATING-HINGE ARISTOLITES

and Quickliter Ballasts

The amazing new GUTH Floating-Hinge Aristolite makes cleaning a pleasure instead of a chore! An easy, quick nudge on the glass panels (right from the floor, with the simple GUTH Gripper-Duster Tool!) and the panels literally "float" free—hanging at the side, out of the workman's way! No time-wasting, dangerous maintenance tricks. It's all as simple as ABC.

GUTH Floating-Hinge Aristolites give open fixture cleanliness with glass panel diffusion and beauty – plus tremendous savings in time and work.

Add to these advantages the Quickliter Ballast. It gives light at the flick of the switch – starterless operation – simplified relamping! The combination makes one of the best looking, best operating – most economical Fixtures ever made!

Write today for full details.

OUR 45th ANNIVERSARY YEAR

THE EDWIN F. GUTH CO.
ST. LOUIS

Guth

Leaders in Lighting Since 1902

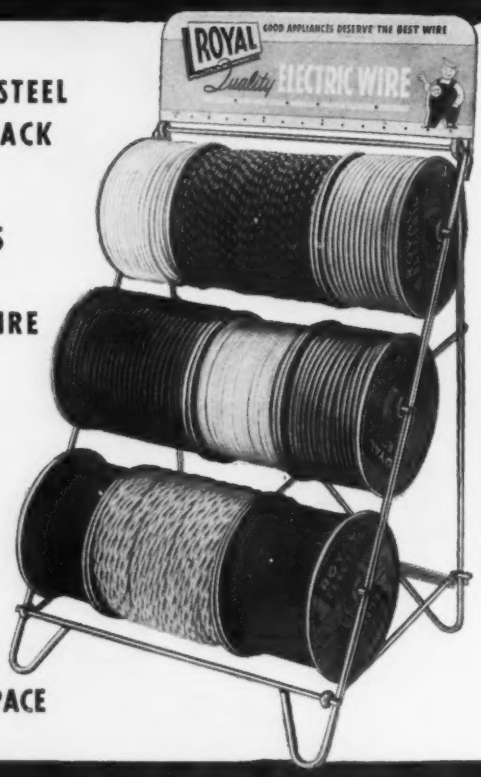
HERE'S HOW TO SELL MORE WIRE...

NEW ALL-STEEL DISPLAY RACK

DEAL INCLUDES 1250 FEET UL APPROVED WIRE

TYPES OF WIRE TO SERVE ALL NEEDS

A COMPLETE WIRE DEPARTMENT IN ONLY 2 FEET OF COUNTER SPACE



GET BEHIND THE NEW ROYAL WIRE DEAL

Put ROYAL quality WIRE right out where the customers can see it . . . with this new, modern, all-steel display rack! No more juggling with loose spools. It's a valuable permanent store fixture that will sell more wire with less sales effort. Write for complete details!

THROUGH YOUR WHOLESALER

ROYAL *Quality* WIRE • CORD SETS
CARTRIDGE and PLUG FUSES • FUSTATS
TROUBLE LIGHTS • CHRISTMAS LIGHTING SETS

ROYAL ELECTRIC CO., Inc., PAWTUCKET, R. I.

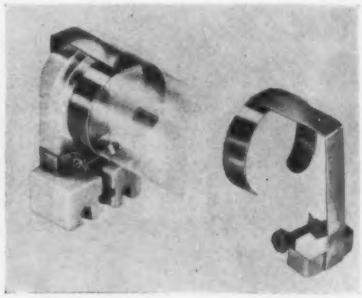
REPRESENTED BY: NORTHWESTERN AGENCIES, INC., SEATTLE, WASHINGTON
ECKERT-LLOYD CORP., SAN FRANCISCO & LOS ANGELES

Decorative Light (915)

Decoralite, a product of Lightolier Inc., is a device designed to serve as a decorative wall treatment during the day and a light source at night. It hangs on the wall like a picture and plugs into any electrical outlet; is a panel of glass or clear plastic decorated with a hand-carved or screen-printed design, framed in an enameled metal shadow-box measuring 18¼x16 in. At the top and bottom of the frame, incandescent lumiline tubes cast a soft light directly downward for reading in bed and upward to illuminate the room. Decoralite comes in a choice of designs for period or modern rooms; metal frames are finished in three colors, off-white, Chinese red, Chinese black.

F Lamp Guard (916)

The Den-El Equipment Co. is making a fluorescent lamp guard to support the lamp ends and prevent their falling out of the



holders. It is installed with a machine screw and nut; is made of stainless steel; available in two sizes for 40- and 100-watt lamps.

Infrared Oven (917)

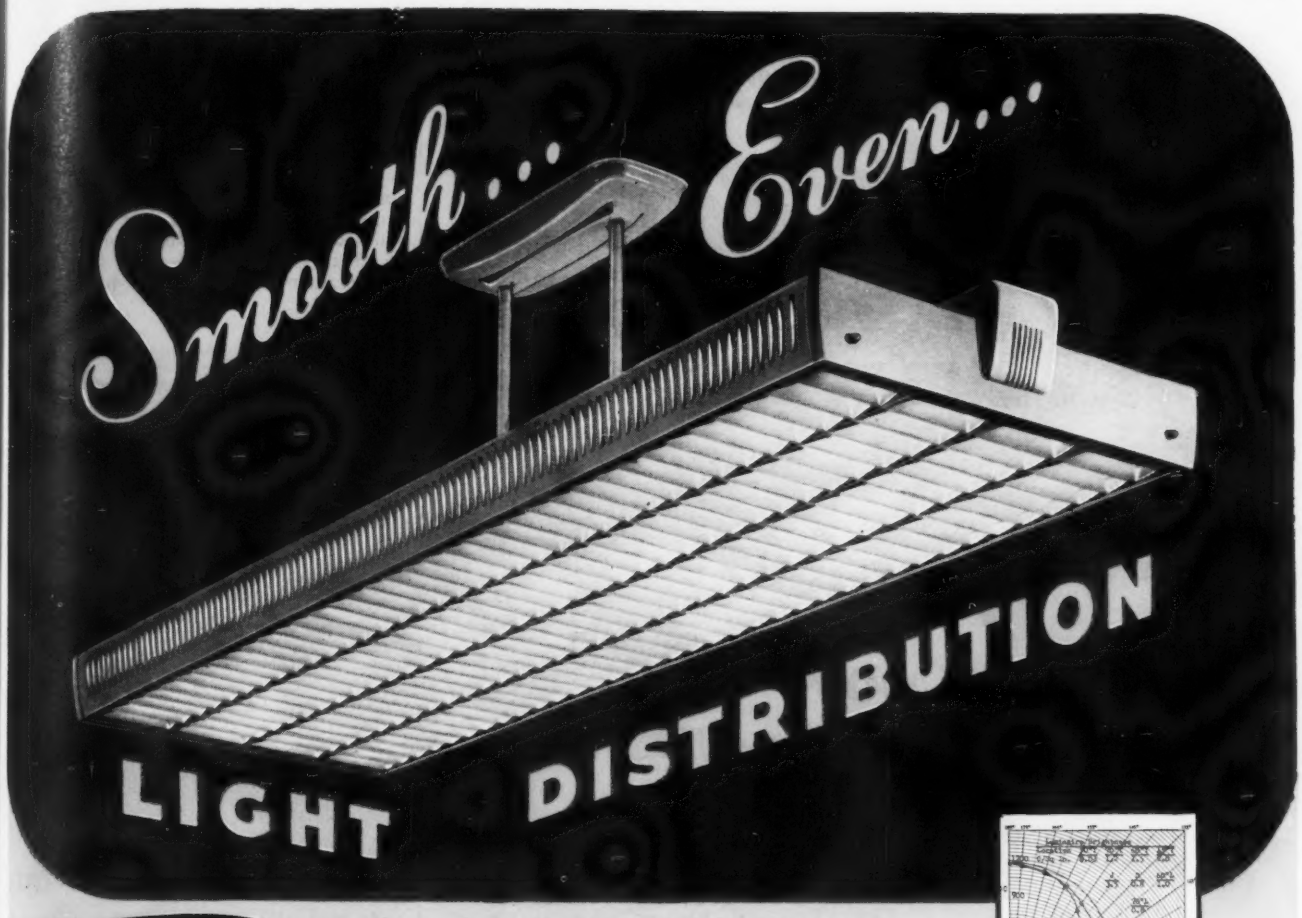
Wil-Son Mfg. Corp.'s redesigned infrared oven has completely enclosed and insulated sections, utilizes combined radiation and convection heating, is built on the company's "minimum oven air content" principle. Patent-Flex tunnel sections are said to offer flexibility as to size and shape of oven, and three-minute adjustment for adoption to different products. Standard units are available in small sections with as few as four lamps up to large sections for the automotive industry.

Slimline Series (918)

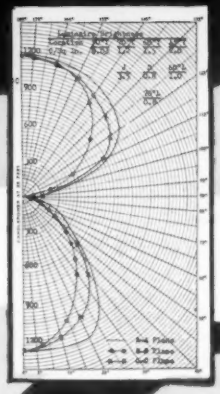
Frink Corp. has added a new slimline series, available for either two or four lamps and for individual or continuous-run mounting. The fixtures are furnished with 2-lamp ballasts for instant-start 200-milliampere operation. Two hinged-louver frames with latches for easy opening give low-brightness illumination with 45° crosswise and 30° lengthwise shielding. Units come either with framed glass or all-metal side panels. Matching spot and downlights are available for combination and accent lighting.

F Diffusers (919)

Tulox fluorescent diffusers, made of Tenite, are standard in seven stock colors and can be secured for large installations in any specified shade. Diameters and lengths are made for standard T-5, T-6, T-8 and T-12 fluorescent lamps. Tenite is cellulose acetate butyrate, product of Tennessee Eastman Corp.; the diffusers are made by Extruded Plastics Inc.



THE CURTIS "Anniversary" Luminaire



CATALOG No. 51

The Curtis "Anniversary" Luminaire (Catalog No. 51) is designed for wide adaptability in application. The simplicity of its design, both functional and decorative, lends itself to a multitude of architectural treatments.

The outstanding characteristic of the "Anniversary" luminaire is its ability to deliver smooth, even light distribution. The completely open top utilizes the light from the lamps for indirect illumination. The downward component, approximately 40% of luminaire output, is effectively louvered 30° lengthwise and crosswise. The attractive dart pattern provides a note of decorative interest as well as being an integral part of the louver construction.

Single or double stem hangers make for easy installation either as individual units or continuous lines. White Fluracite finish on louvers and Satin Gray body combine well with any color scheme. Vertical surfaces throughout provide less in maintenance. Lamps may be replaced from above or from below by opening the hinged louver. Write for additional data.

CURTIS *Lighting*, INC.

6135 WEST 65TH STREET, CHICAGO 38, ILLINOIS

Collyer

BUILDING WIRES

FOR LIGHT...
AND POWER

Collyer Wires and Cables meet every need of the building trade: they fully conform to all N.E.C. and Underwriters Standards, and are known for long life and ease of installation.

RUBBER INSULATED BUILDING WIRE

Braids are impregnated and finished for flame and moisture resistance. Specify Type R for dry locations and temperatures up to 50° C.; Type RH insulated with heat resisting synthetic rubber, for temperatures up to 75° C. Available in braided or lead covered construction for voltages to 5,000 or higher with sizes #14 to #8 solid or stranded, size #6 and larger, stranded.

VARNISHED CAMBRIC INSULATED POWER CABLES (Type V)

These cables require less space and, due to higher safe operating temperatures, carry heavier current loads for a given conductor. High dielectric strength and long life of varnished cambric make these cables preferred for high quality construction. Available braided or lead covered, single or multi-conductor, for voltages up to 15,000; operating temperatures to 85° C.

RESISTOL SYNTHETIC RESIN INSULATED WIRES

Resistol insulation is highly resistant to sunlight, ozone, acids, oils, moisture, etc., and in Type T and TW is approved for general service up to 600 volts and temperatures to 60° C. Having no fibrous covering, this thin wall insulation gives smaller finished diameters and permits more conductors to be carried in a given size of conduit. Available in sizes #14 to 1,000,000 C.M.

The Collyer line is complete. Let us know your requirements.

Collyer INSULATED WIRE CO.

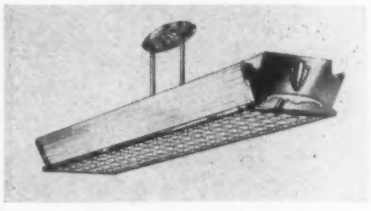
245 Roosevelt Ave., Pawtucket, R. I.

ALLIED INDUSTRIES, INC., San Francisco, Los Angeles, Seattle

Fluorescent Models (920)

The "President", Sunbeam Lighting Co. model 2-1504-48, is for four 40-watt fluorescent lamps, can be mounted singly or in continuous runs, suspended or mounted direct to ceiling. Sunbeam's 1504-S spotlight is fully adjustable and can be used in continuous runs with the President or as an individual unit. The President has steel ends finished in baked silvertone; wiring channel of 20-gage steel finished in baked white enamel; curved side panel of lucite; hinged louvers.

Sunbeam's "Sunlite" is a hinged louver fixture for two or four 40-watt fluorescent lamps. It can be used singly or in continuous runs. Louvers may be hinged from either right or left side.



Switchboard (921)

Mullenbach is offering an all-in-one switchboard which gives main service protection and sub feeder units, with provision for the utility's meter, current transformer and test facilities. It is totally enclosed in a 30x90x14 in. standard die-formed gusset-welded 12-gage stock enclosure with grey baked enamel finish. Standardized units may be either fusible-type vacu-break switch unit or industrial-type air circuit breaker unit, or combination in 15- to 400-amp. sizes, quantity and amperage of units determined by installation.

Precision Switch (922)

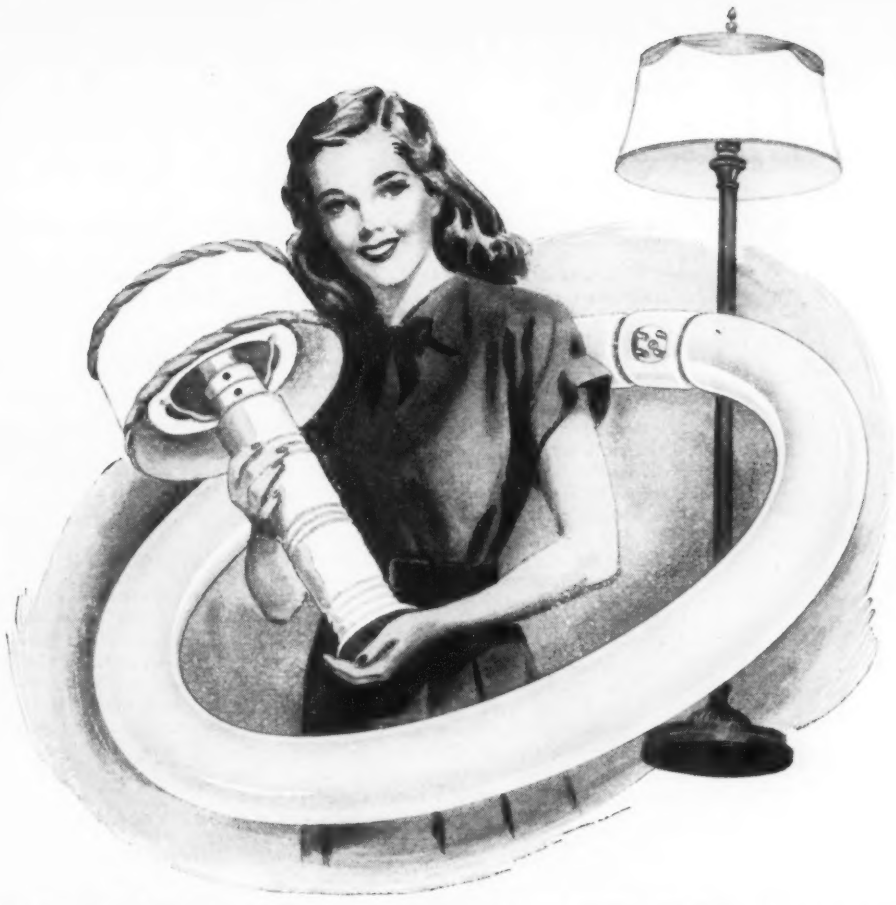
Micro Switch has a new sealed precision switch with adjustable roller arm actuator for use in industrial equipment where the switch is exposed to dust, dirt, abrasives and occasional splashes of oil and water. The switch is said to be designed particularly for cam and slide actuation. The roller arm actuator is adjustable both vertically and horizontally; switch is supplied with either bottom or side mounting facility.

Recording Instruments (923)

Bristol Co. has introduced a new line of recording thermometers and gages known as the Series 500. These instruments operate on the same basic principles as the company's previous models but are housed in a newly developed case and have been improved in design for easier use and greater convertibility. They are furnished in 8- and 12-in. sizes in a variety of ranges.

Hot-Line Tools (924)

A. B. Chance has announced that its hot-line tools are now fitted with heat-treated aluminum alloy fittings for reduced weight.



CUSTOMER SATISFACTION IS "BUILT IN" FLUORESCENT LAMPS...

thanks to Certified Ballasts!

To any portable lamp maker who is employing the new circular fluorescent tube in his product, the vital need for good auxiliary equipment is evident. Specifically, customer satisfaction depends on the BALLAST.

Make sure that the portable lamps you make or sell are equipped with CERTIFIED BALLASTS — for the protection of your customer and yourself!

Proper installation of CERTIFIED BALLASTS avoids excessive heat, which causes injury to table tops and floor coverings. CERTIFIED BALLASTS are free from noise . . . assure longer fluorescent lamp life and most light from the lamps.

The word "CERTIFIED" on the ballast you use means that it is built to rigid specifications to assure satisfactory operation of a fluorescent tube in a portable lamp. Nationally famous Electrical Testing Laboratories tests and checks the product against these specifications . . . give it the stamp of approval. And CERTIFIED BALLASTS have long been the accepted standard in commercial and industrial fluorescent lighting. They're your best assurance of customer acceptance and good will.

CERTIFIED LAMP MAKERS have solved their ballast problems by writing CERTIFIED BALLASTS into their specifications.

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Rugged self-starting synchronous motor; built for long service and reliability. 110 v. 60 c. A.C. Priced from $15 list.

TORK CLOCK CO.

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BULLETINS ETC.

Measurement Systems (925)

A functional analysis and classification of measurement systems and an outline of their historical development are contained in Bulletin GET-1344, available from General Electric. The 28-page publication describes the various uses of the functional analysis method, including its applications to research and developmental problems, to the compilation of data and statistics, and to co-ordination and standardization activities. The necessity of establishing a clear understanding of the functional operation of the measurement system is defined in simple terms. Purpose of the bulletin is to make more simple the basic terminology used in defining operating principles of measurement systems.

Lighting Portfolio (926)

A new Guth portfolio of planned lighting equipment has just been made available. It contains descriptive literature in loose-leaf form on a representative group of Guth fluorescents. The portfolio gives complete details on the construction and performance of these lighting fixtures and provides lighting data and light-engineering factors that enable the lighting man to predetermine lighting results.

Office Lighting (927)

"Over-all Lighting for Offices" is the title of a Wakefield Brass Co. booklet which gives a popularized version of the science of good lighting. It begins with the fundamentals of lighting, tells the results in easier seeing and discusses the problems of maintenance.

Catalog (928)

A compact catalog depicting its complete line of lighting fixtures has been produced by Lightolier Inc. Reordering is made simple by the inclusion in the catalog of an index supplying style numbers, which correspond to those appearing next to photographs of each fixture.

Varnishes (929)

Schenectady Varnish Co.'s new booklet, "Varnishes, Enamels, Synthetic Resins for Industrial Purposes," pictures the research which goes into these products and various steps in their manufacture.

Voltage Control (930)

An illustrated 12-page bulletin on voltage control has been released by the Superior Electric Co. This new bulletin, No. 547, features developments in Powerstat variable transformers and Stabiline automatic voltage regulators. It contains ratings, detail drawings, photographs, and performance and engineering data.

Jet Propulsion Engines (931)

The "Yankee" line of jet propulsion engines is presented in a new full-color booklet announced by the Westinghouse Electric Corp. The booklet describes the 19XB Yankee, the Turbojet that powers the Navy's interceptor FD-1; the 9.5-A Yankee, a Turbojet midget 9.5 in. in diameter; and the new Turboprop, a turbine-driven propeller engine in the intermediate altitude and speed range.

Permanent Magnets (932)

A booklet on G-E permanent magnets has been issued by the metallurgy division of the General Electric Chemical Department. It gives all general information on permanent magnets as well as technical data on characteristics, design, properties and applications of the G-E material.

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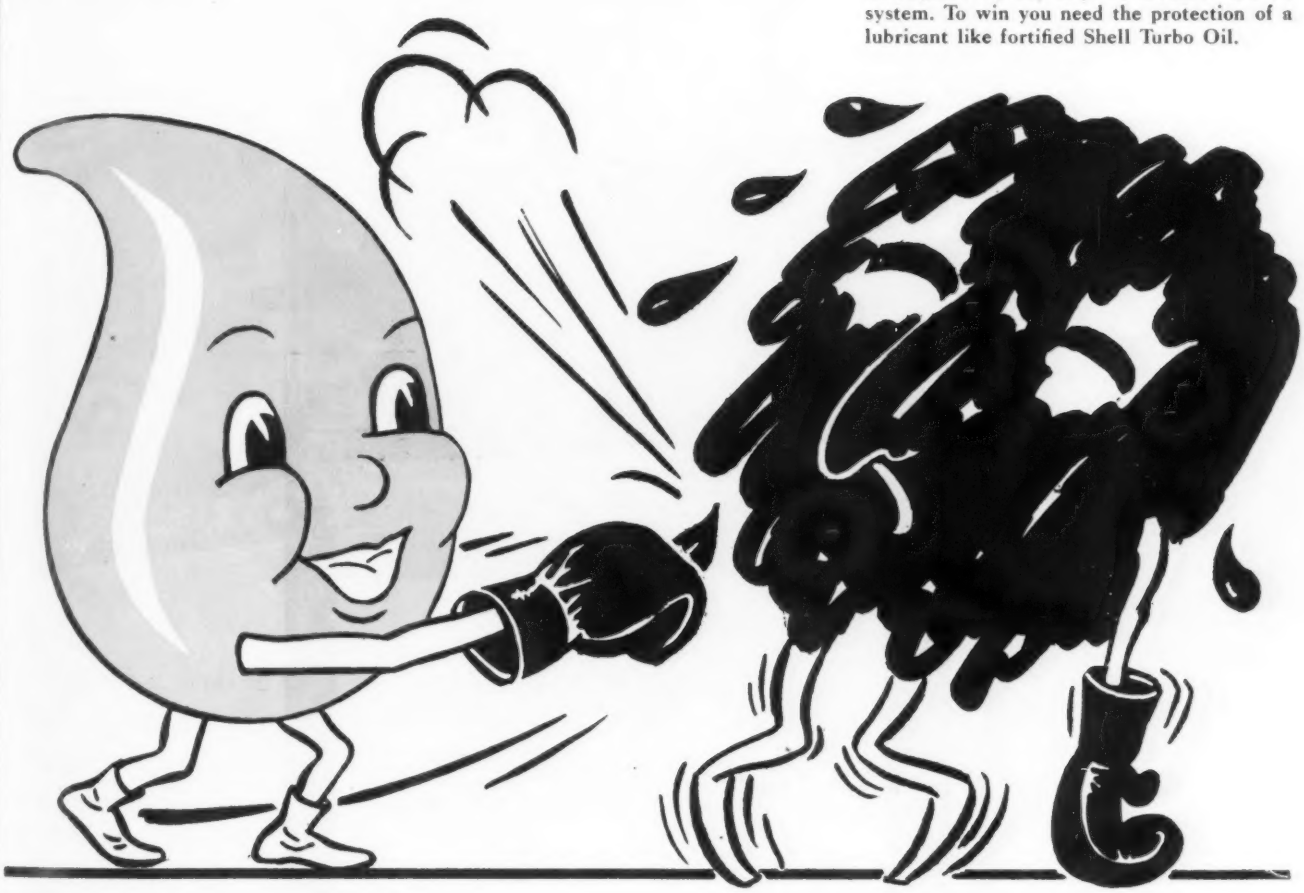

Protect your turbines with SHELL TURBO OIL . . .

Some turbine oils are "born" sludge resistant. Some have this quality added. Then there's Shell Turbo Oil . . . born that way, and made *more* that way.

To manufacture Turbo Oil, Shell selects only crude stocks naturally high in sludge resistance (oxidation stability). Then after a special refining process, Turbo is fortified with Shell-developed additives . . . to build up even greater resistance. Rust-preventing agents are added for further protection.

All this uncommon care in manufacturing pays dividends to users of Shell Turbo Oil. Case histories prove it. After *years* of service, little or no trace of sludge, no rust, no breakdown in the oil—that's the quality of performance Turbo has been delivering in installations of all types.

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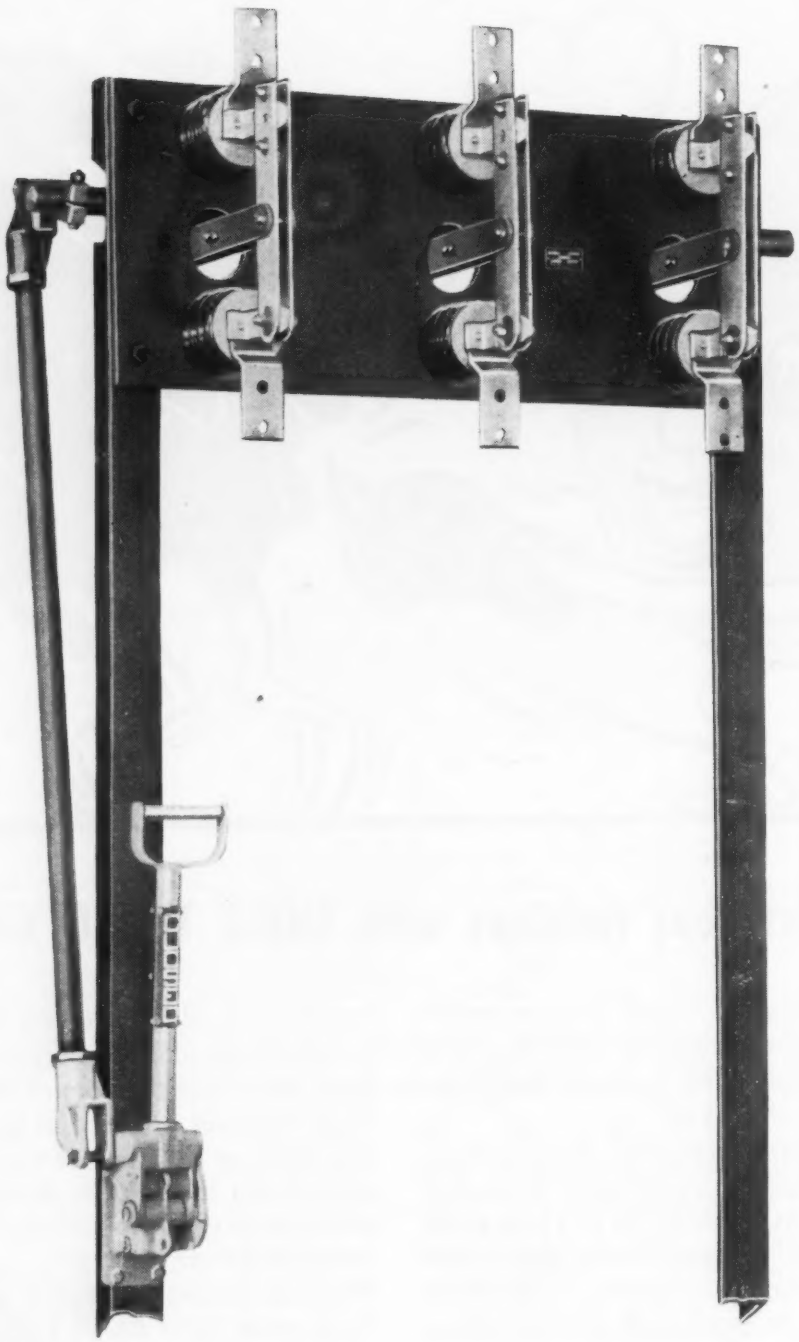

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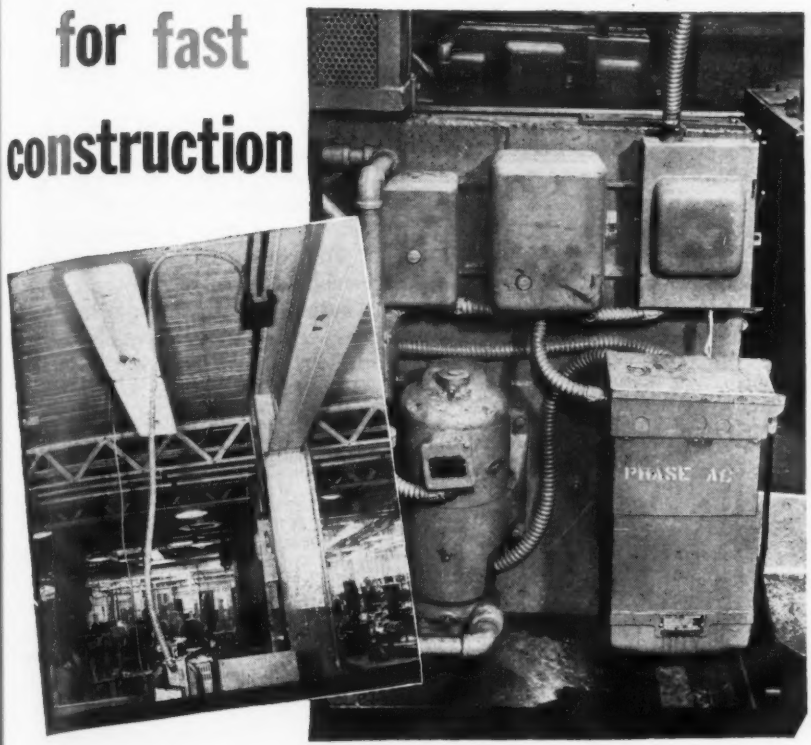
7.5 K.V. 600 ampere Type X.U.
Three Pole, Single Throw
Remote Manual, Group Operated
(3 poles shown)

FLEXIBLE CONDUIT for fast construction



Fast construction demands conduit that's made for speed. And, for real speed, you'll find General Electric flexible conduit hard to beat. It's made to simplify and expedite construction work where time is a factor and flexibility is essential. Investigate General Electric flexible conduit for on-the-job speed.

It's Right for Speed on:

Temporary wiring for construction projects
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Check These Features for Speed and Ease of Installation:

No heavy bending • No awkward equipment
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Let your General Electric merchandise distributor tell you more about construction speed with flexible conduit. Section C61-925, Appliance and Merchandise Department, General Electric Company, Bridgeport 2, Conn.

GENERAL ELECTRIC

RACEWAYS ROUNDUP

with your

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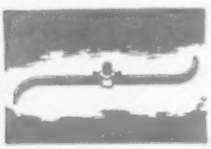
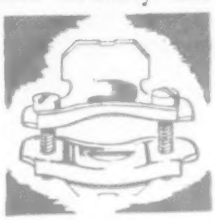
Available Now — General Electric S-type bar hangers are available now, to help you end the annoyance of handling a large assortment of hangers. The S-type bar hanger fits studding on centers up to 24 inches, and can be shaped to fit unusual places.



Nonmetallic-Cable Connectors — Also ready for immediate delivery are General Electric nonmetallic-cable connectors. Exclusive locking flange slips into box knockout easily from outside. Just insert cable and tighten two screws. Fits all common types of PVX and BraidX.*



For Lasting Protection to Wiring, remember the two General Electric lines of rigid conduit: General Electric white, hot-dip galvanized for protection from atmospheric corrosion, and General Electric black, enamel-finished to fight off chemical attack.

Any General Electric Merchandise Distributor will gladly tell you more about the complete General Electric line of conduit products. Don't hesitate to give him a call, whether you need materials or just plain advice.

**Trade-mark Reg. U. S. Pat. Off.*

ELECTRA'S HUSBAND

LAW OF RANDOM PERVERSITY

"WHY do things always have to happen to me?" Electra asked petulantly as I walked into the kitchen late one afternoon. "I put a sunshine cake in the oven and the power goes off. A transformer burned out, the power company said. Then when I was shopping this morning, some Simple Simon who, like you, has never learned how to park a car, backed into my front fender. I guess it is just one of those unlucky days."

"Look, my dear, you weren't unlucky," I said trying to appease her, "you were just the victim of the Law of Random Perversity."

"I've never heard of it," Electra said. "What are you trying to do, kid me?"

"You know I wouldn't do that," I replied. "Chances are you won't find anything about this law in any of the scientific books, but it certainly is older than Newton's law, or Ohm's law or Faraday's or Hooke's or Joule's laws."

"I've never heard of them either," she interrupted.

"Maybe not, but you've been the victim of the law of Random Perversity often enough," I continued. "Like when the phone rings just as you climb into the bathtub or you make a dumb misplay in bridge just when you have a good partner whom you want to impress."

"Or like you tell me after one of your poker games that you had nothing but the second best hands all evening," Electra said. "It's just another name for bad luck."

"No, it isn't quite like that," I said. "It's like you said in the beginning—the perverse things that just seem to happen at the least expected time. You can credit the definition of the law and an explanation of its consequences to one of the girls in the office. She worked it out for a high school English essay. And since she told me about it, I've checked on both its diversity and frequency.

"She claims that as elusive as the law and its consequences may be, it has certain very definite manifestations that permit its inclusion, along with the law of probability, among scientific theorems. For instance the time element is almost always evident as in the case of telephone and bath episode, or when the boss is early on the very day that you oversleep and arrive at the office late or in the destroying of old files at the office just twenty-four hours before the need for some long unused document arises."

"Yes, the timing is always bad," Electra mused. "You won't get any cake for dinner and neither will the Davises after our bridge game."

"This gal points out also that two ends almost always work against the middle," I continued. "This is the phase of the law that sends you out into a rainy night seeking the companionship of a friend who is standing on your doorstep wondering why you aren't home just at the very moment you are knocking on his door. It's the angle that sends you off on a fishing trip for once in your life with plenty of cigarettes only to discover too late that you've lost your lighter and have no matches either. O Henry made good use of this phase of the law in his story, *The Gift of the Magi*, where the wife goes out and sells her hair to buy a chain for her husband's watch which he in turn had sold to buy some combs for her hair."

"That's a little involved, but I think I get it," Electra said.

"Well you can understand this next manifestation," I resumed. "The Law of Random Perversity always utilizes the one wrong factor in a group or series of right factors. Like when you choose the wrong line at the bank teller's window—it was shortest but the girl ahead of you had ten deposits to make and a dozen pay roll checks to cash. Or when you plan a big picnic for the one summer day that it rains like the very devil."

"That's like the momentary perplexity that motivates me to choose Bush Street when I'm in a hurry to pick you up at the office and then get tied up in a couple of traffic jams, whereas if I had taken Post I could have made it with minutes to spare," Electra mused. "Then you wouldn't get that hurt and mistreated look because I happened to be late."

"There is one final angle to the law that is perhaps its worst feature," I continued again. "That is the chain or repeat effect. Once the law hits you, it is liable to strike three times in quick succession. That's the way Al Gage traps me in poker every so often, only sometimes he'll take me for the whole evening.

"It's the kind of thing that happened to your friend Charlie from Honolulu when he tried to book plane passage back from New York a couple of weeks ago. He went to the ticket counter and gave a girl his whole life history along with the schedule he wanted to follow going home. She told him to come back the next day and pick up his ticket. When he returned there was a new girl on the counter. They never had heard of him. There was no application of his on file. Well he repeated the previous day's story and it was all written down. The next day when he came back a second time for his ticket, he discovered that they had booked him out of Chicago the day after his plane left San Francisco for Hawaii.

"But that was only the beginning. Arriving in San Francisco he thought he would verify his next day's reservation for Honolulu. The young lady who waited on him reported after interminable phone conversations with numerous people that his name was not on the passenger manifest for that flight, that no one in New York had requested a seat for him and that all planes were sold out for the next five days."

"What can you do?" Electra asked.

"One other thing about the law is that you never can predict its course nor can you tell when it is going to strike."

Just then the phone rang. "You answer it," Electra said.

When I had hung up she called, "Who was it?"

"The Davises," I replied. "They can't play bridge tonight. Some folks just arrived from the country."

WHY QUALITY CONTROL MAKES RoZone THE SUPERIOR OZONE RESISTING INSULATION

5000-Volt Power Distribution Cable.
500,000 CM stranded conductor, RoZone insulation, with RoPrene (Neoprene) sheath.

The answer lies in the fact that at Rome Cable quality control is positive . . . is in the hands of a group long experienced in wire and cable manufacture. With research and development, product engineering and inspection effectually coordinated under the same *single* executive supervision, the result is threefold unity of function ...development of quality . . . design of quality . . . *control* of quality.

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RoZone was specifically developed to fill the need for a high quality ozone-resistant rubber insulation for general and high voltage applications. RoZone is recommended for low or high voltage power circuits, series street lighting, motor, generator and transformer leads, portable power circuits, station control and signal service. RoZone insulated cables are manufactured with RoPrene (Neoprene) sheath or other conventional cable coverings as specified. RoZone-RoPrene provides excellent resistance to oils, acids, alkalies, and weather hazards . . . is easy to splice and terminate. It is the natural substitute for heavier, hard-to-get lead sheath.

Ro-Zone has:

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GENERAL ELECTRIC REPORTS ON RECENT IMPROVEMENTS

1. ***All ratings now Spirakore* design***
2. ***Sealed tanks prolong oil life***
3. ***Shielded windings, 22 kv and above***
4. ***Improved Pyranol insulating liquid***

The best distribution transformers that General Elec has ever built have been coming off our production li during the last few years. Furthermore, our producti rate has been, for several months, far greater than tha any comparable prewar period.

1. Now they are all SPIRAKORE

All General Electric single-phase distribution tra formers now use the Spirakore rectangular core-a coil construction, one of the really fundamental i provements in transformer history.

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Basically, this method of winding cores from st strip instead of assembling them from punchings p duces a mechanically stronger core. Even more import it produces a core in which the flux path is parallel w the direction of the steel's grain. This permits, in tu the use of corisil, a cold-rolled, oriented-grain st having superior magnetic characteristics in the direct of the grain. Spirakore transformers are small, lig weight, have high impulse strength, and low exci current.

**Reg. U.S. Pat. Off.*

IN DISTRIBUTION TRANSFORMERS

2. *They are SEALED to prolong oil life*

All General Electric Spirakore transformers above 15,000 volts, and the small and large kva ratings of all voltages, now use the sealed-tank construction.

The sealing of tanks for the purpose of prolonging the life of insulating oil has long been a feature of G-E power transformers. Now General Electric is making sealed tanks available, for the first time, in distribution transformers.

Outside atmosphere, with its harmful moisture content, is effectively sealed out by synthetic-rubber gaskets at all openings. These gaskets, compressed against stops or, in the case of the smaller transformers, against a deep-rolled flange on the tank, form a liquid-tight joint without use of cement or gasket stickers.

3. *They are SHIELDED against lightning surges*

All General Electric Spirakore transformers, 22,000 volts and above, have shielded windings.

Shielding was first introduced in the power-transformer field by General Electric in 1926. By preventing severe concentrations of voltages within the windings, the impulse strength of high-voltage transformers has been greatly increased and failures prevented. Now General Electric provides shielding in distribution transformers in the higher-voltage ratings.

High- and low-voltage coils are concentric with each other, and with the grounded core. Insulated metal shields around the coil are connected electrically to each line lead. Surges, which otherwise might produce tens of thousands of volts between adjacent layers and turns, are so distributed as to produce only a few thousand volts—stresses which the new progressive-layer insulation can easily withstand.

4. *They are supplied with an improved PYRANOL**

All General Electric Pyranol-filled transformers are now supplied with an improved Pyranol, designated as No. 1467.

Pyranol is an insulating liquid, introduced by General Electric in 1932, which permits, under the National Electrical Code, the indoor installation of liquid-filled transformers without fireproof vaults. It is chemically stable, possesses all the desirable characteristics of mineral oil, but will not burn, oxidize, sludge or form explosive or inflammable gases.

The principal difference, compared to the older No. 1488, is that 1467 Pyranol neutralizes the hydrogen-chloride gas remaining in the liquid after an internal arc, thus avoiding the formation of hydrochloric acid. Equipment insulated and cooled with this improved liquid may be handled in the same way, in case of failure, as would oil-filled equipment.

NOT A DAY'S PRODUCTION LOST

These improvements, and others, have been brought to you without causing a day's loss of production; furthermore they have been a major factor in limiting price increases. The high volume of production today is in great measure possible only because of savings in critically short materials and the use of new high-speed machines that are a part of the Spirakore improvement program. *Apparatus Dept., General Electric Company, Schenectady 5, N. Y.*

GENERAL ELECTRIC

402-70

PACIFIC ELECTRIC

Dropout Cutout

7.5/12.5Y kv., 15 kv.
1-50, 51-100 amps.

1. Heavy Mounting Bracket
—gives proper support when fuse blows, easy to mount on crossarm

2. Extra Insulation
—heavy single-piece porcelain insulator has long-creepage distance

3. Hinge Assembly
—simple construction; employs toggle to reduce stress on fuse link, prevents breakage of fuse link

The Pacific Electric Fuseholder is supported in the cutout by a toggle hinge held in approximately the toggle position by the fuse link. This minimizes the stress on the fuse link, preventing mechanical breakages that would cause faulty operation.

When the fuse blows, the link releases the toggle and the fuseholder drops and pivots on the lower hinge, swinging outward into the open position.

The heavy mounting bracket withstands shock when high current is interrupted.

By using a switch stick, the fuseholder can be easily lifted out and re-fused in the field. Or a spare fuseholder already re-fused can be hung on the lower hinge and swung into the closed position.

The Pacific Electric Fuseholder is well made, having a heavy single-piece porcelain insulator of high strength with long creepage. No radio interference troubles because of well-bonded surfaces. Permanent high-conductivity because all current-carrying parts are nonferrous metals. Ferrous parts are heavily galvanized after fabrication. The fuseholder is made of bakelite for dielectric strength and for withstanding weather conditions. It has a fiber liner for resisting heat.

Write for full details.

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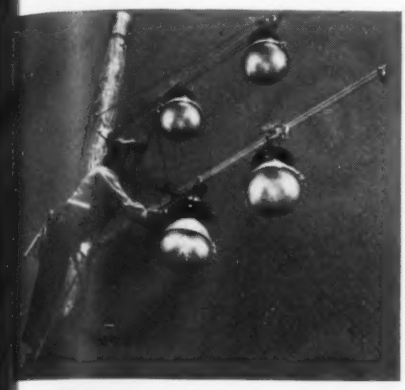
SEPTEMBER, 1947 Vol. 99, No. 3

ELECTRICAL WEST

SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED SECTION OF THE U. S.



Street Lighting Laboratory—A New Promotional Tool

Portland General Electric installs first West Coast outdoor laboratory for demonstrating the latest practice in street and highway lighting. Small towns especially will benefit

FIRST such installation on the Pacific Coast, an outdoor laboratory for demonstrating all that's new in street and highway lighting is now under construction by Portland General Electric Co. and is expected to prove an extremely effective tool for promoting this important type of utility load. Due to the civic aspects of street lighting, the promotion of good installations among the 44 incorporated cities and towns which PGE serves in northwestern Oregon has long been a major activity of its sales promotion staff. It is the company's experience that the improved public relations resulting from efforts to keep the communities it serves well lighted more often than not far outweigh the revenue values of the load. As a consequence it has developed liberal and flexible tariff and contract policies which meet the varying situations found in each community and which provide the foundation stones for an intensive sales promotional program.

Energy for street lighting is made available to incorporated municipalities at the so-called "standard" Bonneville rate. Depending upon the financial resources and the preferences of the individual municipality, the items of system installation, maintenance, and lamp renewal can be assumed by the municipality itself, or contracted for with the company. The result has been that most city administrations have been able to find a financially and politically satisfactory solution for their own street lighting problems, and to answer the demands of local citizens' groups desiring improved community lighting as a retail business stimulator, as a night crime deterrent, as a traffic safety measure, or as a salve to civic pride—demands which on occasion have sparked incipient agitations for municipal ownership.

However, the conscientious desire of the utility to make it as painless as possible for the governing body of a given community to procure a modern street lighting system, by offering low rates, liberal contract provisions and consulting service to aid the community in its design problems, has not made the matter of selling a fully modern system to hard-headed city councilmen clear sailing by any means. Many communities with limited resources continue to put up with a substandard or obsolete system. The sales job of inducing them to invest the money of citizens in a new system involving additional taxation usually resolves itself into a long, hard educational campaign.

Demonstration Needed

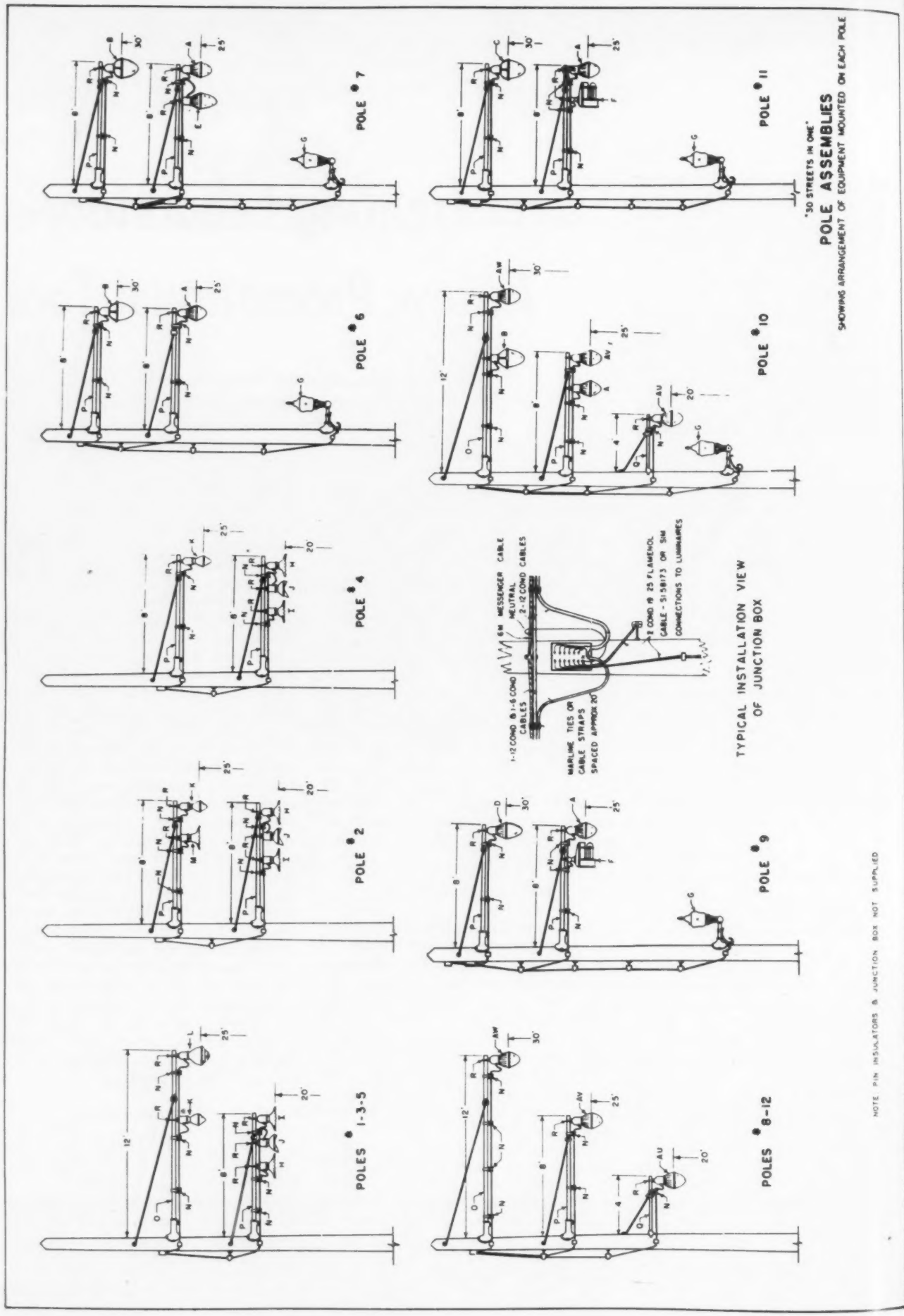
For a number of years the company has sought some effective means of visually demonstrating the difference between adequate and inadequate solutions for a given community street lighting problem. City officials, by and large, are not engineers and have tended to become confused by the conversational mixture of lumens, lamp sizes, lamp standard spacing, luminaire types, mounting heights and illuminants thrown at them by the fast-talking manufacturer and utility representatives. Most cities with which the company has to deal are not sufficiently populous to support a public works department having personnel technically competent to render street lighting advice to city officials confirming the recommendations of the utility and manufacturers. Because of their inability to "see" a planned installation in advance of approval, there is a real danger that tax-conscious officials may allow financial considerations to compromise these recommendations, with resulting disappointment and dissatisfaction with the new system after it is in operation.

The need for a demonstration method has, moreover, become more evident since the war's end with the advent of new illuminants and fixture types tending to make existing street lighting systems obsolescent, increased community growth and traffic density, and a resurgence of demand for street lighting improvements on the part of many cities embarking upon postwar programs of civic development.

PGE announced its intention to set up an outdoor lighting laboratory early in 1946, not anticipating at the time that material shortages would delay completion of the project for a year and a half. Indicative of the intense interest the announcement created among the officials of various cities, however, is the fact that many city councils, with funds long since appropriated, have delayed their final choice of a new system until they could "see how it looks" in the mock-up form that can be created at will by means of the laboratory.

New Laboratory

Location of the laboratory in the city of Portland was decided upon after careful consideration from a number of standpoints. It was desired to have the laboratory within easy travel distance from the maximum number of municipalities in the company's territory and the headquarters of various police and highway traffic agencies interested. A site representa-


POLE ASSEMBLIES
SHOWING ARRANGEMENT OF EQUIPMENT MOUNTED ON EACH POLE
'30 STREETS IN ONE'
POLE #7
POLE #6
POLE #4
POLE #2
POLES #1-3-5
POLE #11
POLE #10
POLE #9
POLES #8-12
TYPICAL INSTALLATION VIEW OF JUNCTION BOX
6M MESSENGER CABLE
NEUTRAL
2-12 COND CABLES
1-12 COND & 1-6 COND CABLES
MARLINE TIES OR CABLE STRAPS SPACED APPROX 20'
1 COND #12 FLAMEPROOF CABLE - 5158173 OR SIM CONNECTIONS TO LUMINAIRES
NOTE: PIN INSULATORS & JUNCTION BOX NOT SUPPLIED

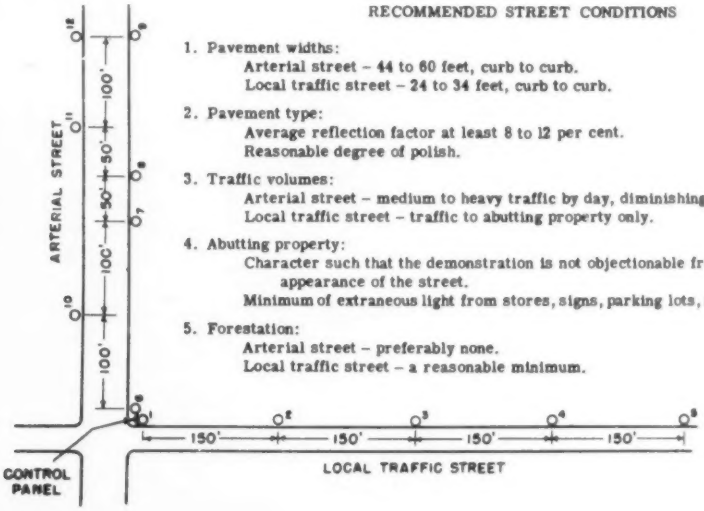
tive of traffic conditions found on arterial highways as well as local traffic streets was desired. Additional requirements were normal conditions in respect to tree growth and street width, and character of abutting property such that possible complaints arising from operation of the laboratory and interference from the extraneous lighting of stores, signs, etc., would be minimized.

Site selection and construction were worked out by Chester W. Jarrett, PGE street lighting consultant, and T. W. Fitch, illuminating engineer. The PGE installation is at the intersection of a main arterial leading from the southern edge of the city, and a side street entering the arterial at a slight incline. The incline, it is believed, will afford a better over-all view of various lighting combinations set up in the laboratory from the control board location at the intersection. The control board is laid out with a submain breaker controlling each type of fixture and toggle switches for controlling individual units on each pole.

Accompanying illustrations show the layout of poles and standards on the two streets selected, and the detail of pole assemblies. Most of the equipment was purchased in kit form as supplied for laboratory purposes by the General Electric Co. Major items include radial wave fixtures for 1,000-, 2,500- and 6,000-lumen lamps; open and enclosed suburban units; refractor units for 6,000- and 10,000-lumen lamps; upright ornamental luminaires; deflector types for both incandescent and mercury vapor illuminants, and sodium vapor luminaires. Up to 30 practical combinations and arrangements of the various units can be demonstrated from the control board.

PGE plans to put the laboratory in service during September with a formal ceremony to which public officials will be invited.

PGE's outdoor street lighting laboratory is located along a main arterial highway and an intersecting local traffic street, shown in the photograph above. Taken when the laboratory was still under construction, the photo illustrates the type of standards and mounting arms being used. How various combinations of street lighting units can be set up in the laboratory from this central control board is demonstrated by Chester W. Jarrett, PGE street lighting consultant (below, left). The board is spotted so as to afford spectators a complete view of the street lighting laboratory without moving away from the board location



RECOMMENDED STREET CONDITIONS

1. Pavement widths:
   Arterial street – 44 to 60 feet, curb to curb.
   Local traffic street – 24 to 34 feet, curb to curb.
2. Pavement type:
   Average reflection factor at least 8 to 12 per cent.
   Reasonable degree of polish.
3. Traffic volumes:
   Arterial street – medium to heavy traffic by day, diminishing in the evening.
   Local traffic street – traffic to abutting property only.
4. Abutting property:
   Character such that the demonstration is not objectionable from the standpoint of appearance of the street.
   Minimum of extraneous light from stores, signs, parking lots, service stations, etc.
5. Forestation:
   Arterial street – preferably none.
   Local traffic street – a reasonable minimum.

Light Pays Off

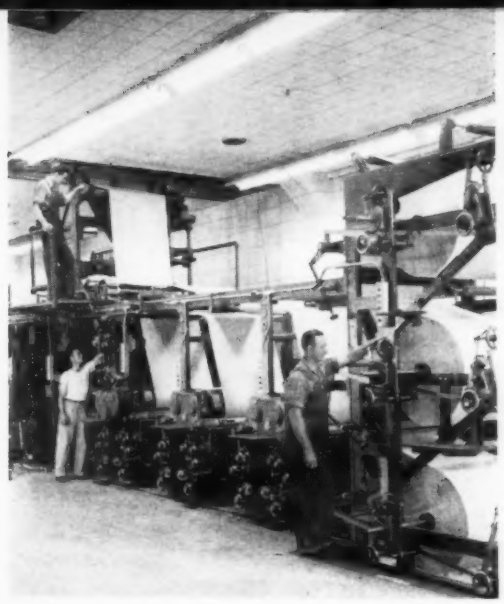
on investment of years of educational work

Semi-Indirect Incandescent

Union Title Insurance & Trust Co., San Diego, served by San Diego Gas & Electric Co. Data: area 8,700 sq. ft.; ceiling height 15 ft. 6 in.; 48-1,000-watt Wakefield Commodore units; standard suspension with 1,000-watt inside frosted lamps; light-colored Celotex ceiling and cream walls with gum-wood trim. Foot-candles, 24. Despite the popularity of fluorescent, this illustrates that well-engineered incandescent still gives comfortable seeing

Diagonal for Drafting

Large drafting room in Sacramento, lighted by 4060 Curtis louvered, two-lamp, 40-watt fluorescent fixtures mounted on 5-ft.-10-in. centers on two-foot stems, in continuous rows diagonally of the room. Ceiling height is 12 ft., and ceiling accoustical plaster reflection factor reduced to 45 per cent due to soil. After 800 hours burning foot-candle readings are approximately 75. This room contains 250 units in a 33x60-ft. room, or 25 sq ft. per unit. Note the mounting of one unit at right angles to the continuous row to escape heating unit and still deliver light at an angle to the drafting boards below. This eliminates shadows and the reflected glare on paper surfaces



Light on the News

Pressroom of Walla Walla Union-Bulletin, like the offices and job shop, are illuminated for seeing. Continuous rows of two-lamp, 40-watt, fluorescent Smoot-Holman industrial fixtures on ceiling reach into press

Combination Serves Dual Purpose

Combination of fluorescent and incandescent lighting in Union Market, Spokane, serves dual purpose of good over-all interior lighting and attractive open-front show window. Use of forty 40-watt 3,500° white fluorescent lamps in fixtures parallel to window and eleven 150-watt incandescent globes in recessed reflectors give 45 foot-candle illumination. Service provided by Washington Water Power Co.

Light for Beauty

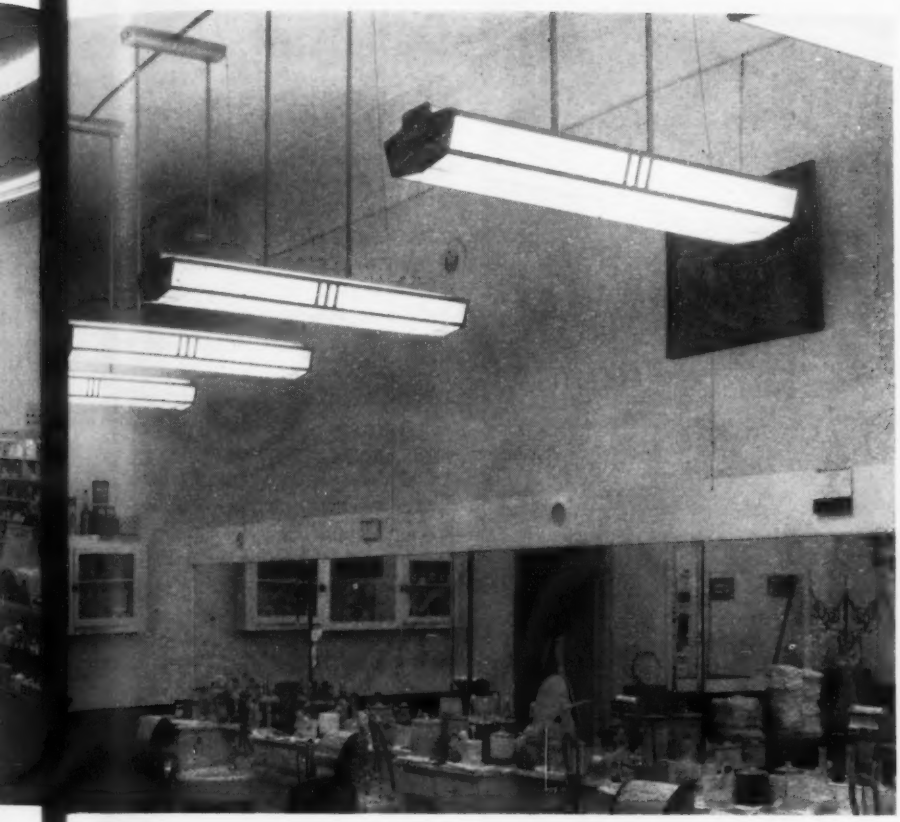
Ex-Cel-Cis Beauty Salon, Salt Lake City, served by Utah Power & Light Co. Data: semi-direct fluorescent luminaires in continuous rows on ceiling with 10-ft. spacing; intensity 75 foot-candles. Louvered-bottom fixtures with diffusing glass sides provide glareless source of light with even distribution

Good Lighting Pays Off

"Brightest corner in town" was the aim when remodeling of the Ballou-Latimer Drug Co., Boise, Idaho, was begun after store burned some time ago. Four units of twelve fixtures each on 16-ft. ceiling, and continuous strip lighting for displays in wall cases have gone a long way toward accomplishing just this by giving an average intensity of 75 foot-candles on merchandise. In the words of Melvin C. Smith, manager, "Good lighting to enhance our displays was necessary. Since remodeling and relighting, our business has enjoyed an average increase of 50% and we have noticed considerable increase in night business from tourists who comment on the brightness of our store. Good lighting pays and is the cheapest advertising we buy."

Rx for Drugstore Lighting

Maintained intensity of 90 foot-candles in this Compton, Calif., store of the McCown Drug Co. is provided by six continuous rows of Day-Brite Coronado fixtures above and parallel to aisles. Supplementary window lighting, not shown in photo, conforms to high standard of illumination by being increased to approximately 200 foot-candles. This installation is served by Southern Calif. Edison Co. Such installations are typical of the higher intensities now demanded by the fast-turnover types of business who recognize lighting as a sales force

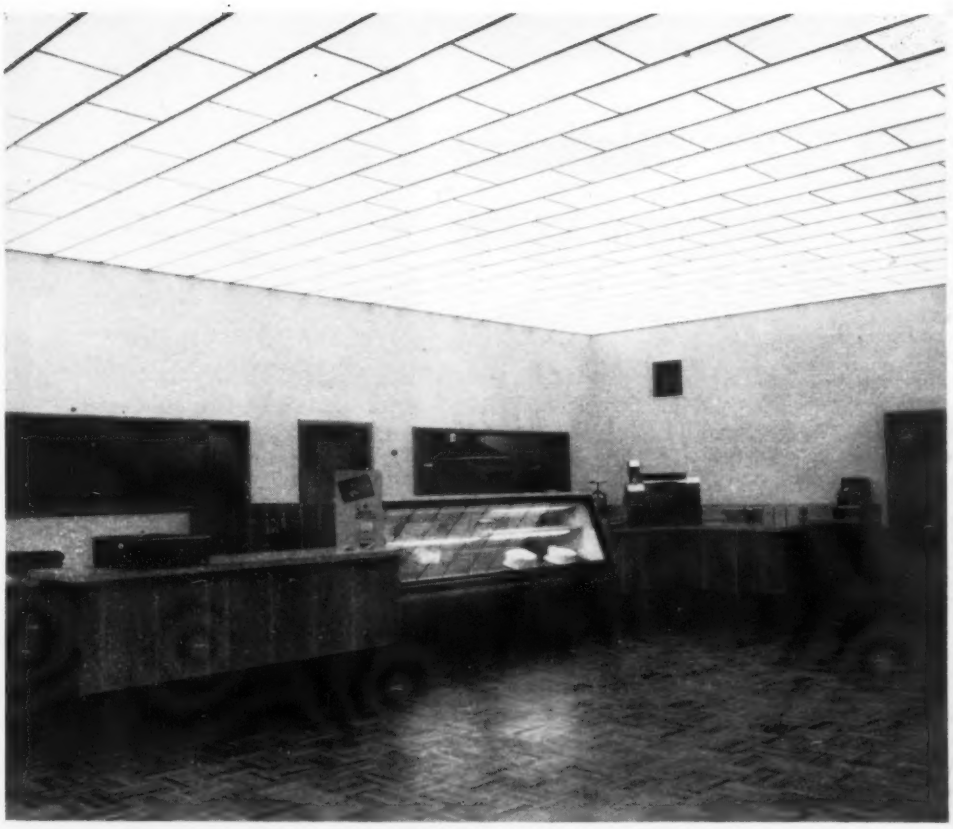


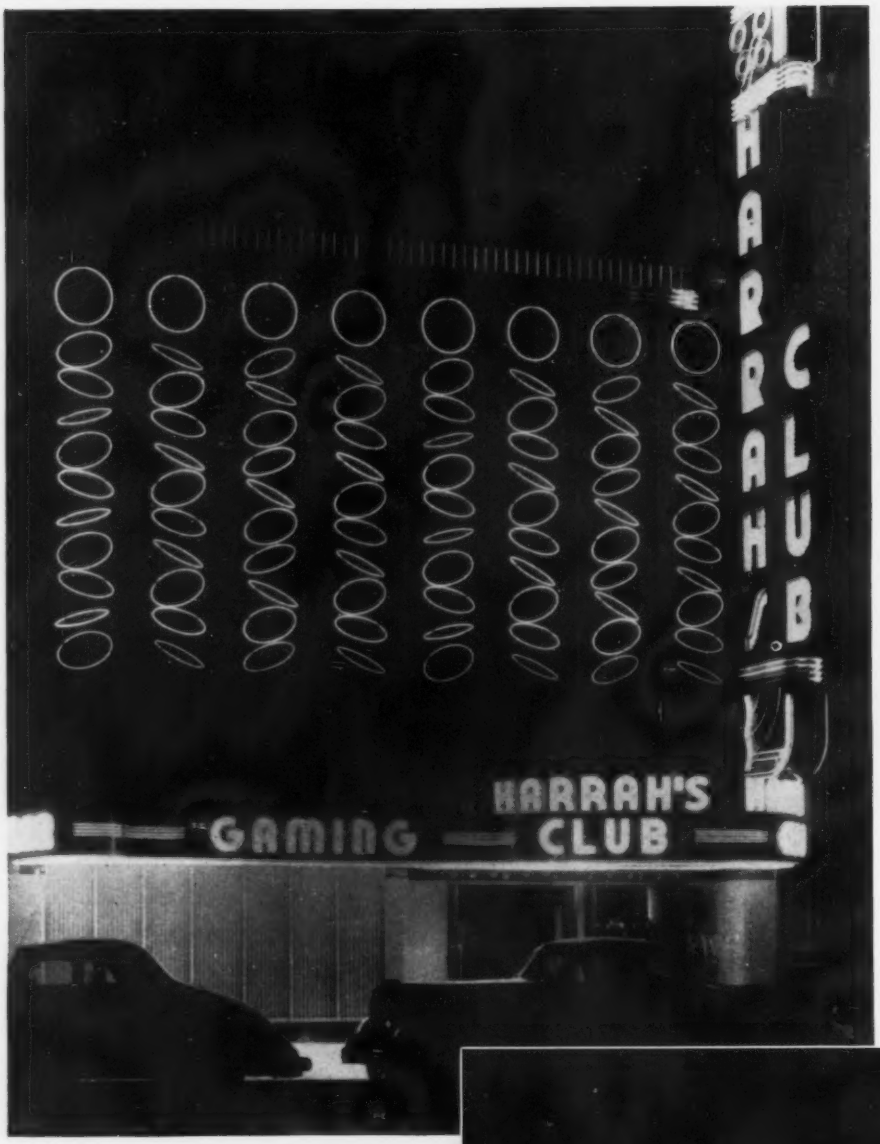
Barber Shop Lighting

It has seemed almost impossible to light a barber shop and satisfy everyone. If light sources are placed to suit seeing needs of barber, there are invariably reflections and glare in mirrors that produce annoyance and eye strain. The problem has been solved in a Marysville, Calif., barber shop by W. H. Meuron of PG & E. Louvered fluorescent fixtures with luminous side panels were placed at right angles to the mirrors, one on each side of barber chair. The same arrangement is used on customer's side of the room, so that neither he nor barber gets any glare. Fixtures are 4 ft. apart, or adapted to spacing of the chairs, and 7½ ft. above the floor. Ends of fixtures almost reach the wall over the mirrors. Lighting is soft and plentiful

Luminous Ceiling Technique

Lighting of Duchess Sandwich Co., Oakland, done by Spott Electrical Co. To obtain high intensity and provide lighting to fit the very modern architecture of this show room, a great deal of engineering and design was necessary. The entire ceiling is constructed of Albalite glass suspended by extruded aluminum supports. To provide equal intensity and absolute shadowless light, custom Cathon cold-cathode lighting was used. Same glass ceiling treatment extends to the extreme of the canopy on the outside of the plate-glass window





Dollars of Light

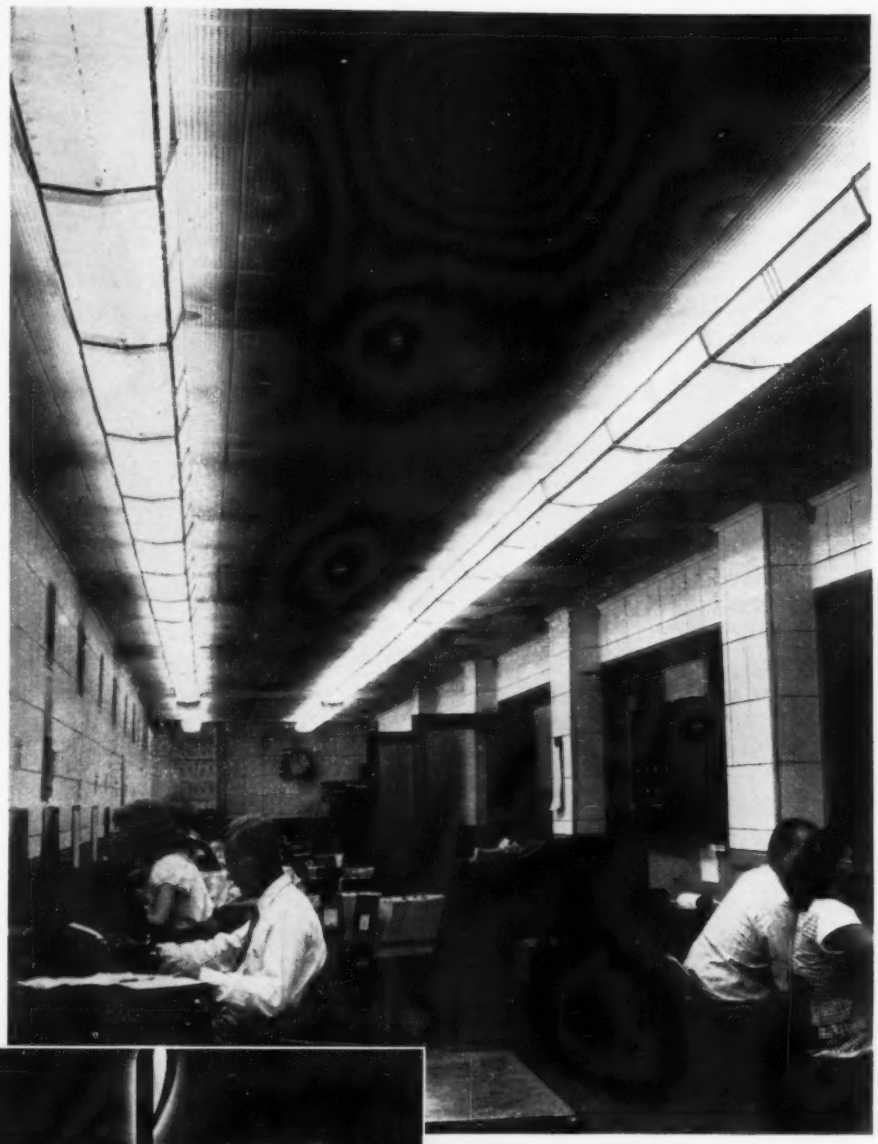
Striking lighting on front of Harrah's Club in Reno. This sign is 40 ft. high and consists of both neon and incandescent lighting. Horizontal lettering and marquee are made up of four parallel neon tubes operating on 120-ma. transformers giving the brightness of daylight on the sidewalk. The perpendicular lettering, "Harrah's Club," is lighted by 1,800 small gold-colored incandescent lamps with sparkling effect. Circles are neon tubing, giving the effect of dropping coins. Total sign consumes approximately 200 amp. and operates through eight master flashers. Service by Sierra Pacific Power

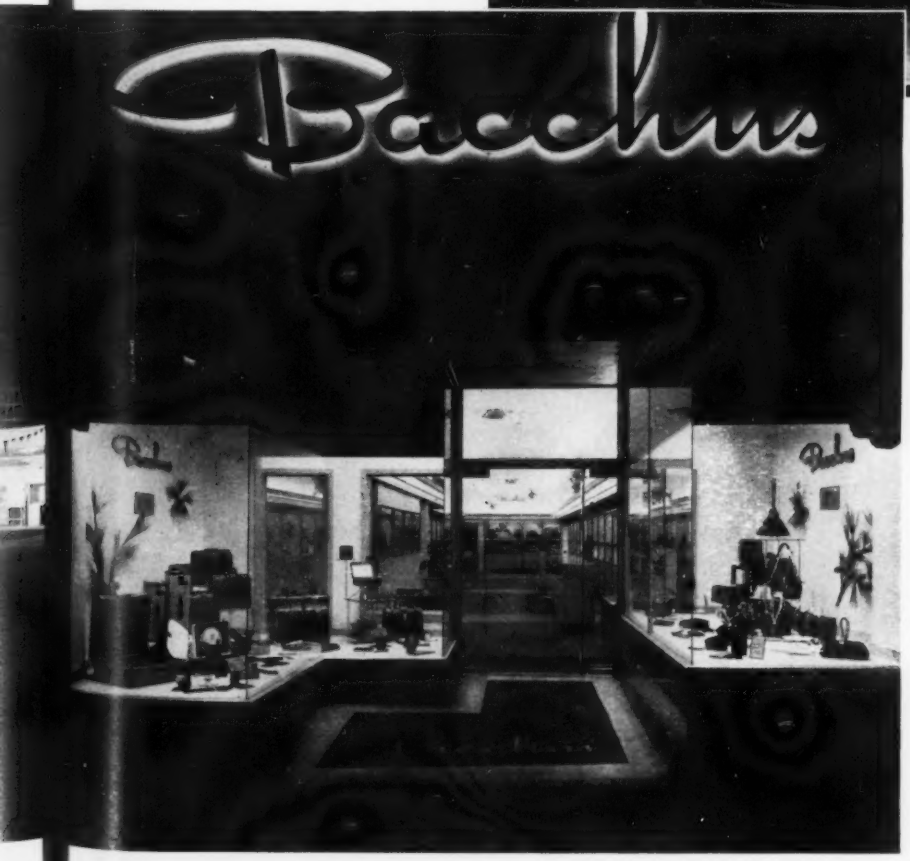
Lighting a Shopping Center

Shippey's Service Station and Radio and Appliance Sales and Service, Los Angeles, served by Dept. of Water and Power, is good example of how light can be used to attract attention to a new shopping center. Data: eight, 1,500-watt floodlights for driveways, four 750-watt lamps for building floodlights, fourteen 150-watt vapor-proof canopy lights. Owner credits lighting for 300% more business than expected for this location

Light for Fine Work

To meet severe requirements for illumination of a room for bookkeeping, Valley National Bank of Phoenix, Ariz., has made this installation. Two rows of 18 Day-Brite Viz-Aid units each lengthwise of the room furnish 55 foot-candles at working level. Serving agency for the job is Central Arizona Light & Power Co. Installation was made by New State Electric Co., Phoenix. The job replaced a former cold-cathode installation, whose marks can still be seen on the accoustical ceiling, not yet refinished when this photo was taken. Ceiling brightness ratio is much better than is apparent from this photograph of it





High-Level Window Lighting

Inviting exterior lighting of the Bacchus Luggage Co., Seattle, served by Puget Sound Power & Light Co. Use of ordinary window reflectors supplemented by reflector spots gives high level of 100 foot-candles general illumination and 200 foot-candles beneath spots. Interior lighting is by six-tube continuous-strip cold-cathode cove, frosted glass under tubes, open on top. Foot-candle levels inside are 42 general to 46 under the coves

Lighting Ensemble

Designed for its over-all or ensemble effect, the lighting in Tracy's Ladies' Apparel in Vancouver, B.C., presents a soft and pleasing atmosphere for sale of women's apparel. Center cove has eight rows of 3,500° white cold-cathode tubing. Each wall has an indirect cove with nine 100-watt fluorescent lamps in continuous rows mounted end to end to give shadow effect of lamp sockets. Each of six decorative wall niches has two 30-watt daylight fluorescent lamps and the wall case displays have a continuous row of white 40-watt fluorescent lamps. Provision has been made for spot-lighting from pillars and for incandescent downlighting from units to be recessed in ceiling

A Solution for High Ceiling

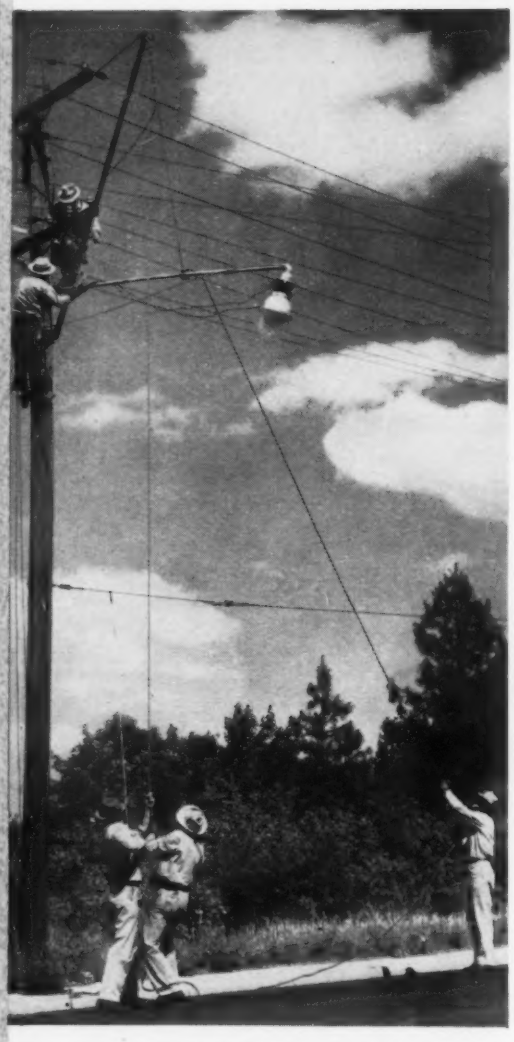
Outstanding postwar installation is illumination of new Stadium Branch of First National Bank of Portland, Ore. Total of 92 units of 500-watt lamps with Corning glass lenses are mounted on nine-foot centers at 27 ft. ceiling height. An even, glare-free intensity of 50 foot-candles at three-foot level is obtained throughout the room. Serving agency is Pacific Power & Light. Glenn Stanton, architect, designed so that units may be serviced from above the ceiling. Installation was made by Barker Barkon Corp. of Portland, Ore. Functional design is keynoted

Jewelry Brilliance

Peggy Shop, San Francisco, is served by Pacific Gas and Electric Co. Data: wall cases six 150-watt frosted daylight incandescent lamps giving 150-180 foot-candles, counter one 20-watt white fluorescent lamp per case section giving side cases 125 foot-candles, middle case and top of cases 50 foot-candles. General lighting is supplied by recessed panel in ceiling containing two soft white 40-watt fluorescent tubes. Case lighting was the idea of Mr. Phillips, manager of store. Architects were Roselyn & Gartner, and electrical contractor, Baker Electric Co. The impression is one of a jewel box, sparkling and brilliant, as if lighted by the jewels themselves

Cold Cathode For Drafting

Drafting rooms at Douglas Aircraft Co.'s El Segundo plant are lighted to an intensity of 45-52 foot-candles with 479 Colovolt cold-cathode fixtures. Southern California Edison is the serving utility. Data: floor area, 31,000 sq. ft.; fixture spacing, 8 ft. x 8 ft; mounting height, 10 ft.; 65 sq. ft. of floor area per fixture; 152 watts per fixture; 2.34 watts per sq. ft.; 45-52 foot-candles after 850 hours. Operation is now at 50 cycles. When Southern California Edison cuts over to 60-cycles, the wattage per fixture will be increased from 152 to 217



Washington Water Power Co. crews place bracket and fixture for street lighting installation in the city of Spokane's residential section

There are 143 new lights in the North Division job shown at right below. Former lighting shown in picture at left

SPOKANE is well on the way as the leading city in the nation in planned traffic safety lighting and general illumination of its residential areas. Already more than ten miles of the city's arterial streets have been brilliantly lighted with modern safety lights installed by the Washington Water Power Co. under a sweeping plan developed by its engineers in cooperation with the city planning commission. The lighting plan calls for a $600,000 investment by the power company. Under the extended program 5,300 new light directing luminaires will be installed. A thousand of these lights will turn night into day on the more heavily traveled arterial streets. and the balance will be installed throughout the residential section.

Nearly half of the arterial lighting has been installed, taking rapid strides since the turning on of 101 lights on North Monroe Street last November. This and several other projects put into effect since that time account for about ten miles of traffic safety lighting, and another ten miles are scheduled for installation as rapidly as equipment is received. The residential program is also in progress with 4,300 lights eventually replacing and augmenting 1,800 old-style units now in use.

So far reaching is the plan that when it is finally fulfilled all the principal traffic streets will be fully lighted in accordance with the standards of the Illuminating Engineering Society code for traffic safety. In addition. every residential block in which there are two or more occupied lots will have at least one modern fixture at the street intersection.

Shortly before the war, the Washington Water Power Co., in cooperation with the city planning commission, as a result of a traffic accident survey, selected the most dangerous area in the city for pedestrian accidents after dark. A particular "hot spot" was selected where during a four-year period prior to November 1939, fifteen pedestrian accidents had occurred—all after dark. Ten people had been injured and five had been killed. The street lighting in the area consisted of one 300-watt open conventional-type street light at each intersection.

As an experiment, ten modern controlled light luminaires were installed by the power company along one curb line of the street, 125 ft. apart. Each fixture contained one 500-watt lamp. The results were startling. In five and one-half years since the safety lighting was installed, only two nighttime accidents were reported from the former

RELIGHTING STREETS

death trap, and these were only minor injuries. This was a score of five to one in favor of the new lighting so far as injuries were concerned, and a score of five to nothing concerning deaths.

Delayed by the war, no further action was taken to make general improvements in street lighting until 1944. The power company then proposed a plan for the development of a safety lighting program for the city to be made a postwar project. The plan was based on two things: a reduction in the company's already low street lighting rates which had long been planned by the company, and a traffic flow survey conducted by the city. On completion the plan was presented to the city council where it received an immediate and enthusiastic approval.

The city has been zoned for lighting needs based on traffic flow. Most important division is the heavy traffic classification which includes the down-

own, or central business section. This ection is now lighted by carbon arc amps in ornamental fixtures, but will e newly equipped with mercury vapor amps which transmit a brilliant blue-hite light. Such areas will be given ights with an output of 16,000 lumens, nd the fixtures will be placed 90 to 00 ft. apart.

Next classification, which takes in any of the through streets, is the edium-heavy traffic division. Streets all into this group if they carry 7,500 9,600 cars in 12 hours, with a peak ighttime hour of 900 to 1,200 cars. hese streets receive 6,000- to 10,000-umen lamps staggered from 100 to

SPOKANE'S

Albert Gruber

ashington Water Power Co.

25 ft. apart. The medium traffic reets will have 3,000- to 4,000-lumen ights, staggered at 150 to 200 ft.

The residential traffic classification ncludes those residential streets which hannel traffic into arterials. This pro-ram provides for 2,500-lumen lamps each intersection where there are wellings adjacent to the streets. In ome areas such as double-length locks and where the need exists, arger lamps and additional units will e supplied: (1) one 2,500-lumen mp at each intersection of streets arrying local residential traffic and here there are dwellings adjacent to e intersection; (2) one 2,500-lumen mp in addition to the one at the ntersection where blocks are double e average length and where more an 50% of the block is occupied.

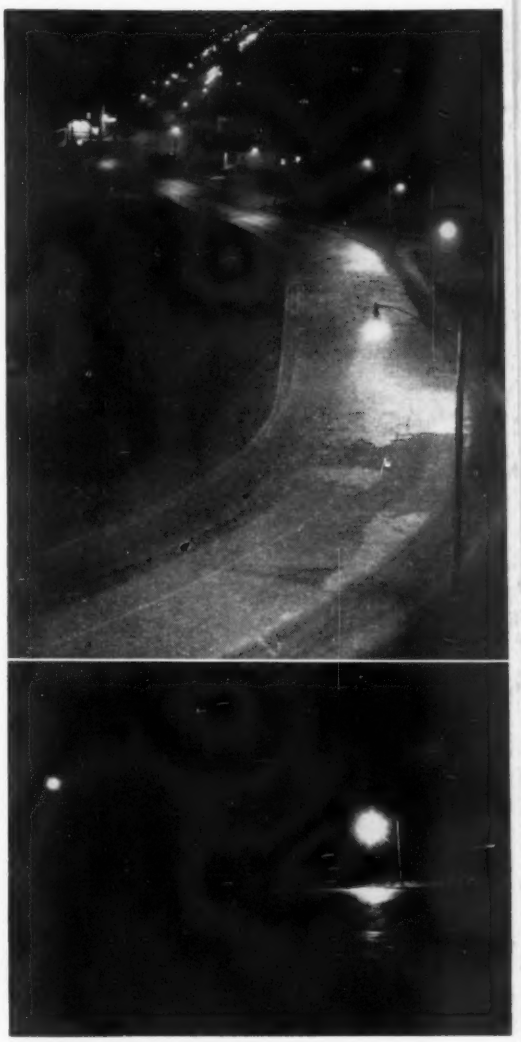
Selection of locations is made by e city, and the power company in-alls lights in accordance with the eneral plan adopted by the city. Lights e mounted 23 to 25 ft. above the roadway on mast arms that extend 12 to 16 ft. over the street. Light is controlled and is spread over a large area engthwise of the driving lane.

The plan is flexible and adaptable to changing requirements. When a street now rated as having medium-light traffic develops more traffic or if accident frequency increases, necessary changes can be made. The first step would be to increase lamp sizes to the next larger size. A further additional light increase could be obtained by adding poles and units at the curb parallel to the staggered units and, if still another increase is desired, additional poles and units would be added midway between the parallel poles. Finally the area could be lighted exactly as the central business district.

Six major arterial streets have already been lighted since Nov. 1, 1947, and smaller sections of other projects have been completed. Generally over the city, residential lights have been installed.

The city of Spokane has welcomed the plan, which was made possible largely by a sizable reduction in street lighting rates, and the company's willingness to make the necessary investment and installation of equipment. The city's cost of operating the traffic safety lights, as now installed on arterial streets, is paid from the allocation of state gas tax funds, and does not come from the city's street-lighting budget. Savings are used to expand the residential lighting system.

While the delivery of equipment has shown some improvement in the last few months, it is still a factor holding up full-scale progress on the plan. Steel mast arms are notably in short supply. When equipment is available, crews install more than 100 fixtures each month. Other Inland Empire cities on the Washington Water Power system are also benefiting from the experience gained in Spokane, and these municipalities have laid plans to modernize their lighting systems.



First arterial relighting in Spokane was on North Monroe St., shown above, with 101 lights. Before and after views show the improvement

Improvement at N.W. Blvd. and Glass St. shown in before and after views below. Old lights can hardly be found

Safe Light for Spray Booth

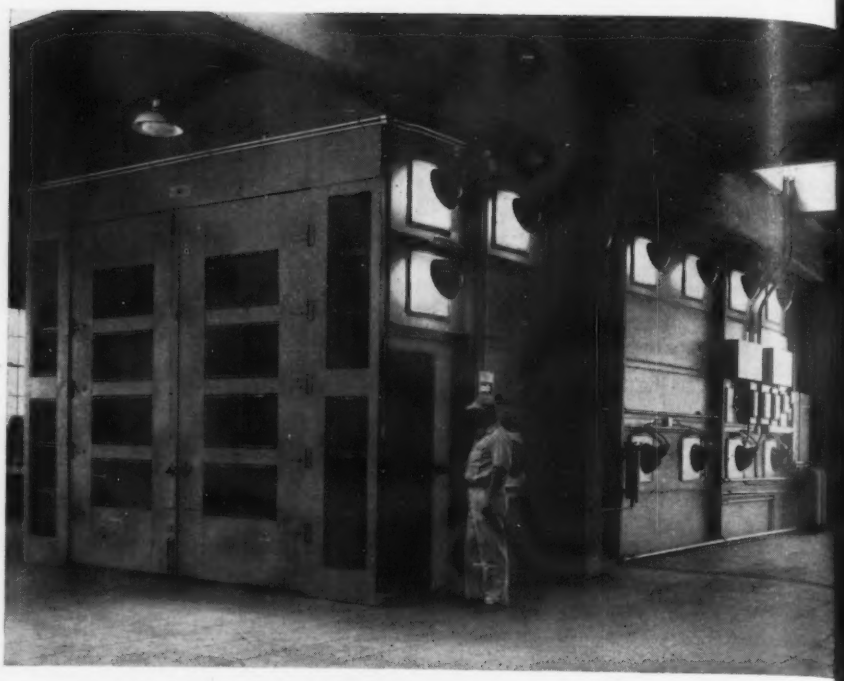
What constitutes a safe paint spray booth has been the subject of much discussion. Inspectors have wondered what is safe and have held long discussions at their meetings.

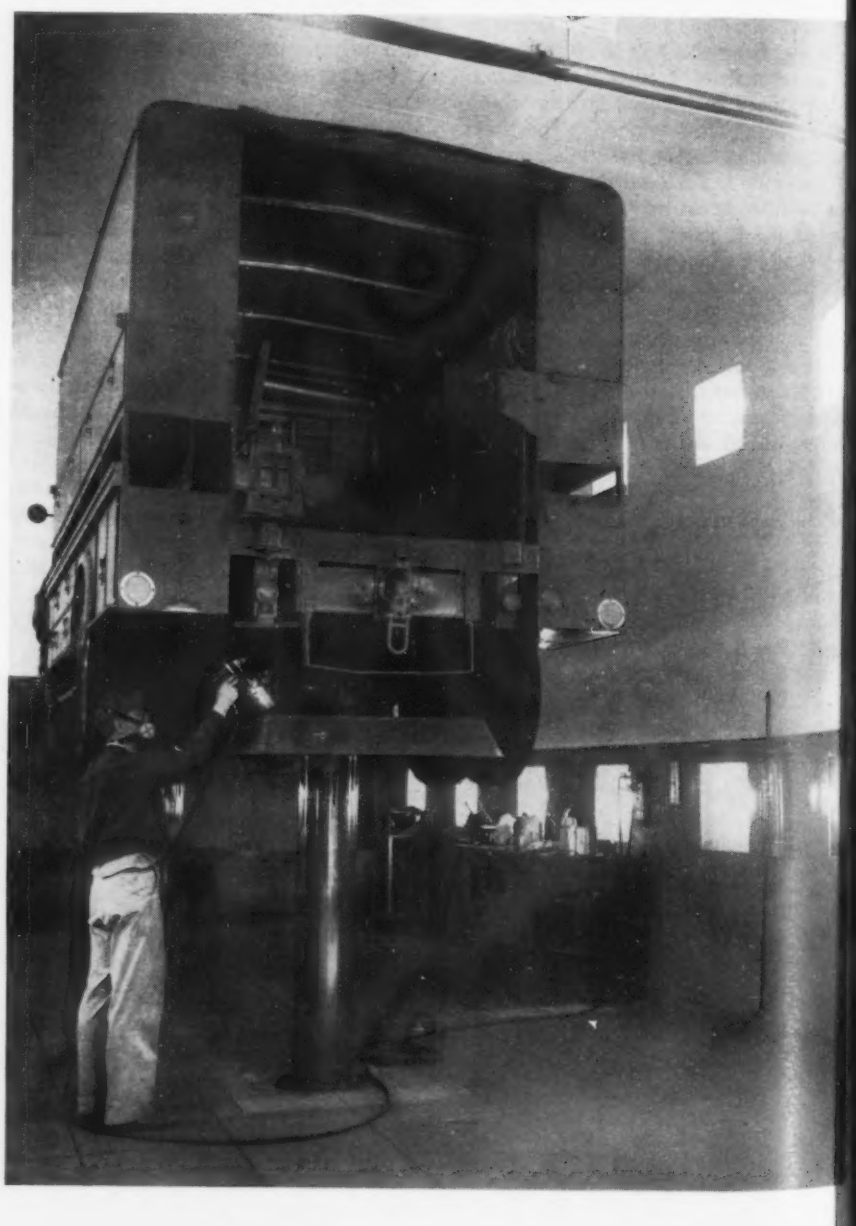
An example of one that seems to meet all requirements of safety has recently been installed by the San Diego Gas & Electric Co. The booth is lighted entirely from the outside by 28 500-watt lamps in elliptical angle reflectors as shown. The light shines through wire-glass-covered two-foot square openings in the sides of the booth. Lower row panels are 4 ft. from the floor; upper row 12 ft. above the floor. Lighting on the vertical surfaces of cars or trucks in the booth averages approximately 70 ft.-candles. Total lighting load is 14 kw.

A battery of fans draws filtered air through the booth, assuring cleanliness and moving the off-spray away from the painter so that he is never enveloped in a cloud of paint spray. An important safety feature is the water-washing unit at the end of the booth. This traps the off-spray and prevents it from being exhausted into the atmosphere. Thus the air outside the booth is just as free of paint spray as that inside, and fire hazard is kept to a minimum.

Another nicety of design in this installation is that the reflectors are mounted on hinged brackets which permit raising them into better position for relamping. Thus not only are all switch contacts and lamps mounted outside the booth, even the relamping can be done entirely from the outside. Lamps are located far enough away from the glass panels to permit air to keep them cool and thus further reduce possibility of heating the paint residues that might accumulate on them to any dangerous temperature.

The spray booth is 39 ft. long, 17 ft. wide and 16 ft. high, large enough to accommodate easily the largest company trailer or truck, according to Sam Middleton, transportation superintendent. Installation was made by the company's own mechanical staff.



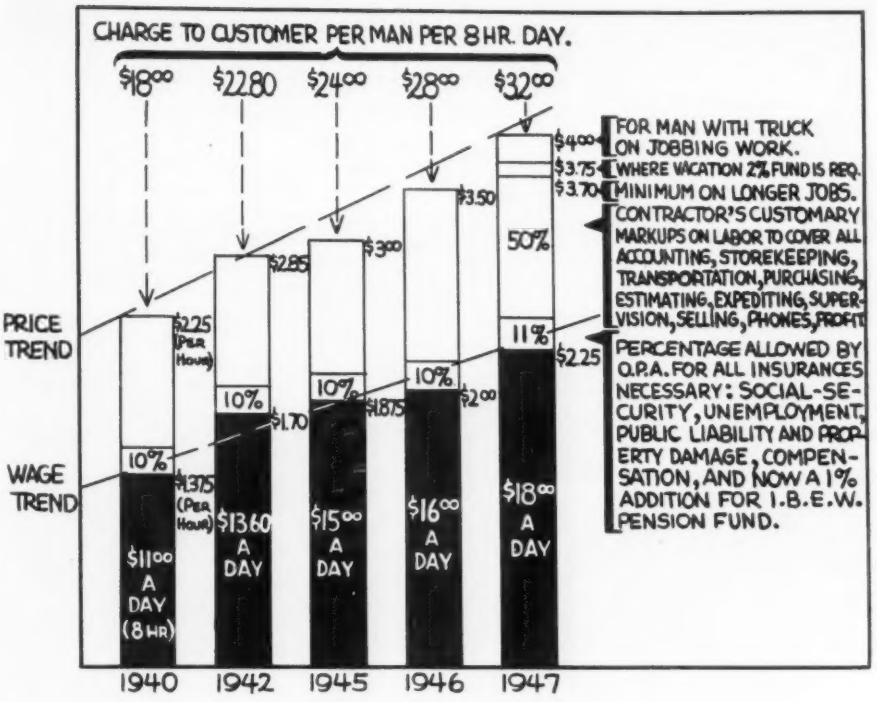


● To SHOW customers the reasons why their lighting should be planned by an expert before they invest money in fixtures, a complete planned lighting program for stores, first of five major projects in the Edison Electric Institute Lighting program, is now being distributed to utility commercial executives.

How Wages Hike Prices

So much loose, unthinking talk is going around that business is making so much money it can afford to pay more wages without increasing prices, it might be a good thing to *look* at what actually happens. Sometimes it is more convincing to *see* a condition when it is drawn or pictured.

As a concrete example, there has been a wave of wage increases for electrical workers, brought about by a concerted drive and even some strikes. In the negotiations, the employers, the contractors, are told that they can well afford to pay more, since they have made such good money lately. Yet, while it is true some have made money, this is not universally true. Such a blanket claim shuts its eyes to what *really* takes place when a wage rate is increased.



The chart on this page pictures what has been happening since 1940. The wage rate in major Western cities is taken as a case in point. The wage for a journeyman electrician under union contracts was $1.375 an hour in 1940. Contractors added an average of 10% for the insurances connected with hiring of men—social security and unemployment payments to the U. S. Treasury and to the state, public liability and property damage, and employer's liability and health claims.

Then through long custom, substantiated by such pricing services as the Pacific Coast Electrical Sales & Data Book of the A. E. Rowe & Co., a mark-up of 50% on wage cost is considered to be an average percentage necessary to take care of the contractor's overhead in the handling of labor, plus what profit he may have for his pains.

This overhead on a man's time includes his transportation to and from the job, the services of the stock and tool room to supply him, the office costs in keeping records on his time, his various social security entries in the books, the estimating and sales time used to secure work for him to do, supervision and direction of his work, expediting of materials to him, phone service in his behalf, and other such costs of doing business.

Look then what the placing of these *percentages* on a wage rate does to the price necessary to charge for his work.

It should be noted too that in 1947 *new* and *additional* percentages are being added. First is another 1% of labor pay roll to contribute to the union's pension fund. In Oakland and such cities that yielded to the demand for a vacation with pay (even though no definite plan has been set up as yet) an additional 2% is to be collected and held for a vacation fund.

Thus what an electrician did in an hour in 1940, at $1.375 an hour or $11 a day, and for which the contractor charged the customer $2.25 an hour or $18 a day, now in 1947 costs the contractor $2.25 an hour, or $18 a day, for which he has to charge from $3.70 to $4 an hour or $29.60 to $32 a day.

But in addition to this large increase in wage, contractors find a big decrease in efficiency and workmanship. Where it took one man four to six hours to wire a house for a range it now takes from six to eight hours. Where it took a man half a day to install some new lighting or hook up a motor it takes a couple of hours or a half a day longer.

Another factor enters where three men work on a job. Union contracts require a foreman. He receives 12% more wages than the journeyman. Price must be raised to from $4.25 to $4.50 an hour where a foreman is included. Three men on a job, a foreman and two journeymen, cost the customer at least $100 a day. It has to be pretty important work to merit such a price.

Without consideration of the poorer efficiency, look at the *trends* which these *facts* indicate. Note the *rate* of climb of the price line compared to the wage line.

When an electrical worker reasons only that *his* cost of living is increasing, therefore he must get more money, he doesn't see what *his* wage increase does to the *price* of his service—and how that is reflected in the endless chain of life back to his own cost of living, because he increases the cost of doing business with electricity for everyone who supplies him with some of life's necessities or luxuries.

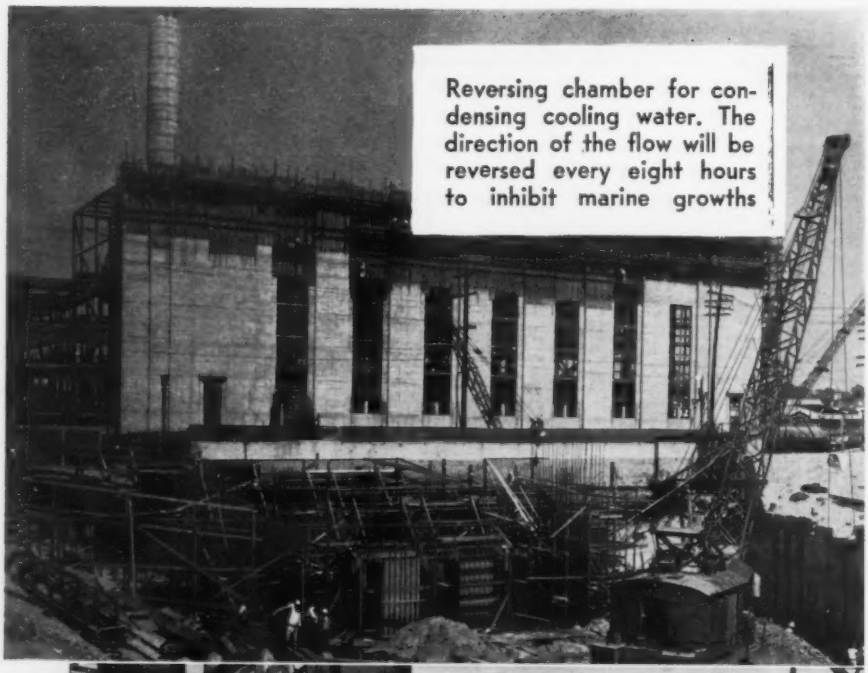
While the electrical worker's wage is used in this diagram, a similar thing happens when the wages of any other workers in the industry are raised. All contribute to bringing electrical service close to the *refusing point* on the part of the users—the public.

Warning to Trade

Warning has been issued to the electrical trade in Vancouver, B.C. that the city of Vancouver Electrical Code allows a maximum of 1,320 watts on any plug-in appliance. It is pointed out that there are appliances available in Vancouver at present which are rated at 1,650 watts. By selling such appliances the dealer leaves himself open to prosecution by the Vancouver Electrical Department as every appliance sold must bear an approval stamp of the C.S.A.

Electric ranges of over 9,000-watt capacity can not be connected to three No. 8 wires, it is also pointed out, but must have three No. 6 wires. In the case of ranges rated over this capacity the Electrical Department urges contractors and dealers to make certain that the range wiring will handle the additional load.

PACKAGE UNITS GAINED



Reversing chamber for condensing cooling water. The direction of the flow will be reversed every eight hours to inhibit marine growths

Large fuel oil storage tank from which oil will be pumped directly to burners at Redondo (Calif.) plant

FIRST extensive use of standard turbine-generators and boilers in the West is to be found at the 240,000-kw. Redondo Beach steam station of Southern California Edison Co., now well along to completion. At least a year's time was saved by use of these package units. Ordinarily, larger units would have been used, but availability of 60,000-kw. machines and the 400,000 lb. per hour boilers led to the decision to follow the new ASME-AIEE standards. Of the two temperature-pressure combinations available, 950 psi. and 850° was chosen because of the stand-by nature of the plant and its design load factor of 35%.

Redondo has several outstanding features. Most spectacular is provision for reversing the ocean condenser cooling water to inhibit marine growths. By a system of gates and chambers, direction of flow will be reversed every eight hours, more or less. Sudden change in temperature and direction of flow is expected largely to eliminate troublesome marine growths that build up and restrict flow.

A first in handling of the fuel oil is provision for pumping directly from storage tanks to burners. This has eliminated intermediate storage tanks and all the pumps and piping that normally are required with conventional practice. A new feature in the Babcock & Wilcox steam generators is provision for washing soot from the superheaters while the boilers are in operation at light load.

Of particular interest electrically is the fact that automatic field control will be applied to large generators for the first time. One of the first two machines will be supplied by General

Laying two ten-foot concrete conduits for condenser cooling water. Pipes will extend 1,900 feet out to sea on floor of the ocean

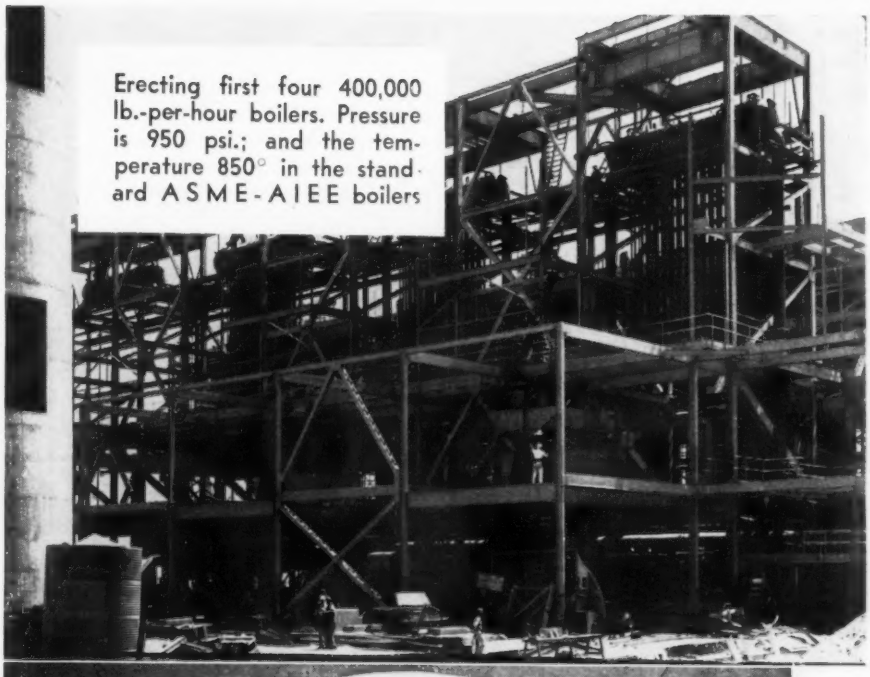
AT REDONDO A YEAR

Electric Co. with Amplidyne control: the other by Westinghouse Electric Corp. with Rotrol. These devices are essentially amplifiers and will provide automatic high-speed response in regulating the shunt fields of the main generators under normal system conditions as well as during faults to maintain constant voltage. Decision to use this type of field control was based on Edison's successful application of the Amplidyne to a 50,000-kva. synchronous condenser and a 60,000-kva. frequency changer set.

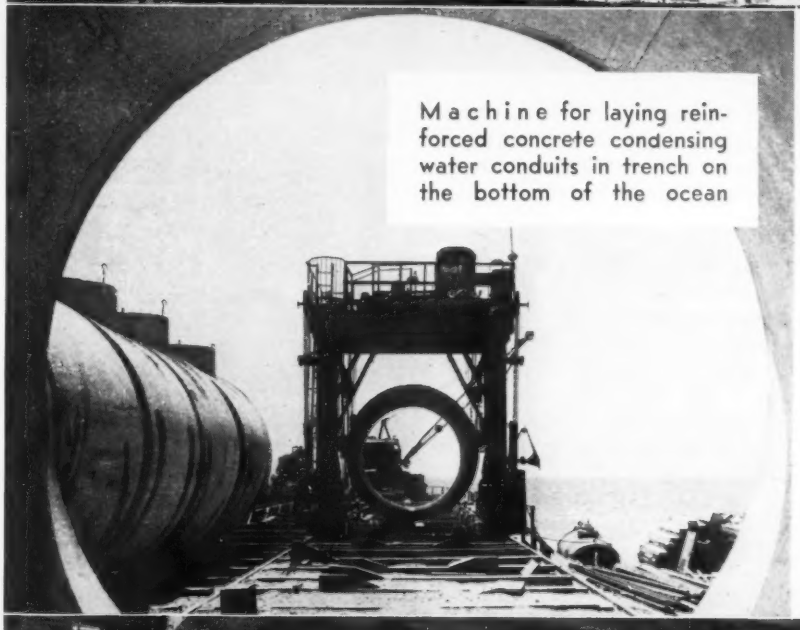
REDONDO, being intended primarily for stand-by operation after the present tight power situation is over, was designed for quick pick-up. Main units will pick up 75-80% of full load instantly when operating at minimum load of 5-10 mw., and will come up to full load in ten seconds. The 7,500-kw. house unit also is quick starting.

Main generator leads are carried by tunnel to a switchrack where power will be stepped up from 13.2 kv. to 66 kv. for transmission to La Fresa, 220-kv. substation five miles distant, where it will be fed into the backbone of the Edison system. A feature of the 69-kv. disconnects, supplied by Cole Electric Co., is a design incorporating insulator posts inclined 15° so that fog drip will fall clear of the skirts below. In addition, a fresh water washing system also will be used.

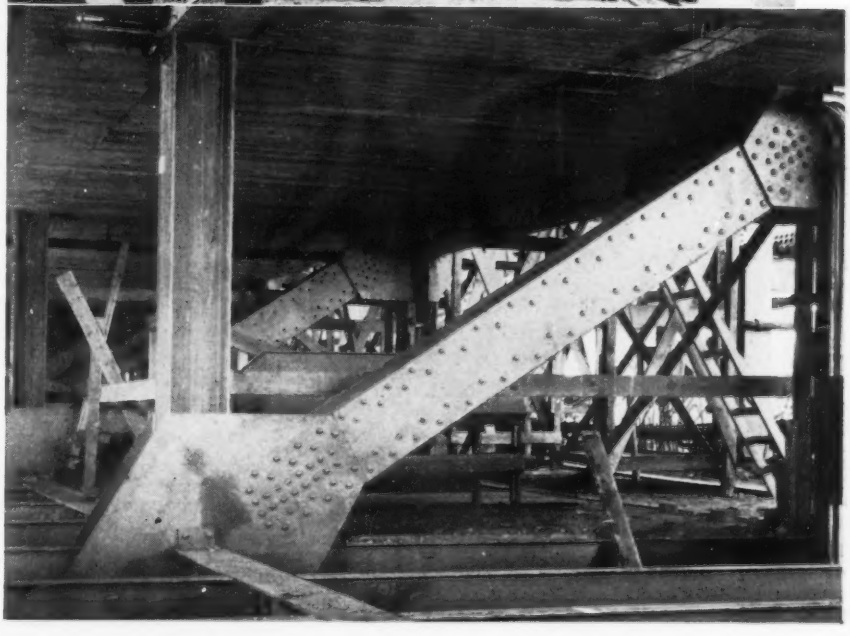
Redondo was designed and is being built by Stone & Webster Engineering Corp. in close collaboration with Edison engineers. Operation of the first two 60,000-kw. units is expected by February 1948.



Erecting first four 400,000 lb.-per-hour boilers. Pressure is 950 psi.; and the temperature 850° in the standard ASME-AIEE boilers



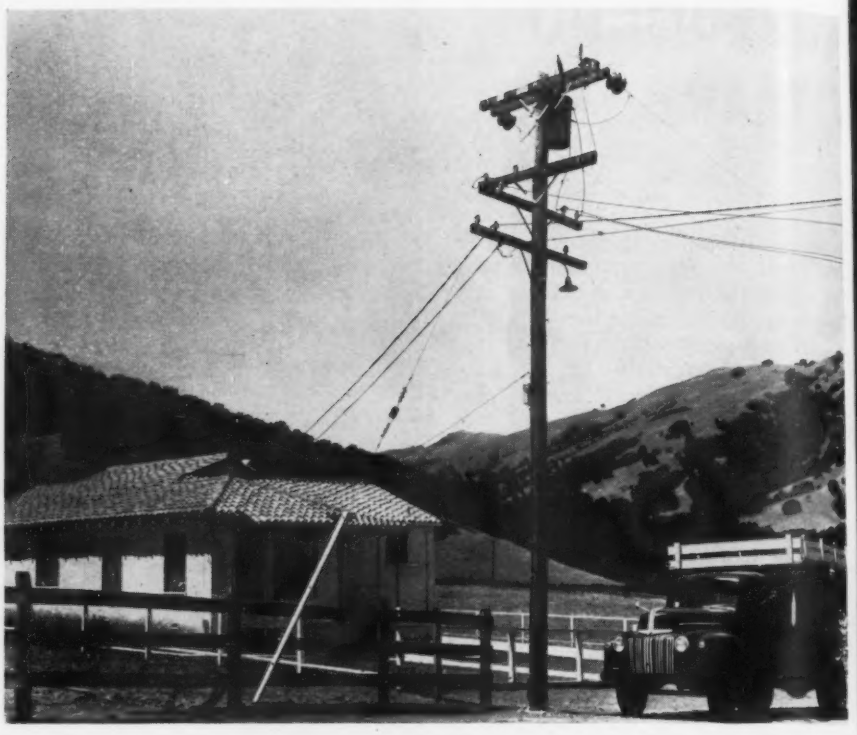
Machine for laying reinforced concrete condensing water conduits in trench on the bottom of the ocean

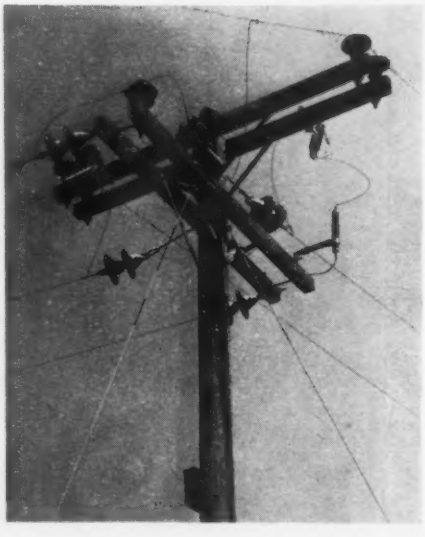


Earthquake bracing. Located in an area that is subject to seismic disturbances, the Redondo plant structure was very heavily reinforced

First Three-Phase Rural Carrier Telephone

A kick out of going for an inspection trip over this carrier job with engineers of the telephone company was a phone call from a dairy ranch by the engineering editor of Electrical West to Editor George Tenney, who was in an automobile equipped with a commercial mobile telephone installation driving around the streets of San Francisco. The call went via carrier over five miles of PG and E 11-kv rural line; open wire and cable to the San Rafael exchange; cable trunk across the bay to San Francisco and then by commercial FM space radio to the mobile unit. Despite all the types of channels involved, conversation was as clear and satisfactory as straight city telephone exchange service. It was really quite remarkable





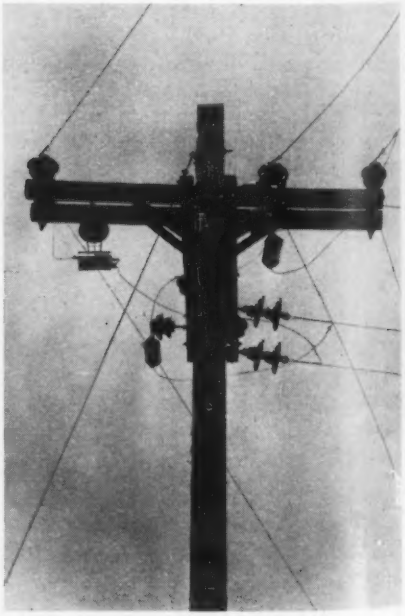
Above: A subscriber's terminal pole mounts a 1-amp. 11-kv. fuse, coupling condenser and a terminal coupling unit

Left: Line chokes for 3-phase tap and terminating coupling unit are shown on pole where only two phase wires continue on out on main power line. One of the two phase wires that extend on is the one to which coupling was made at origin of the carrier channel

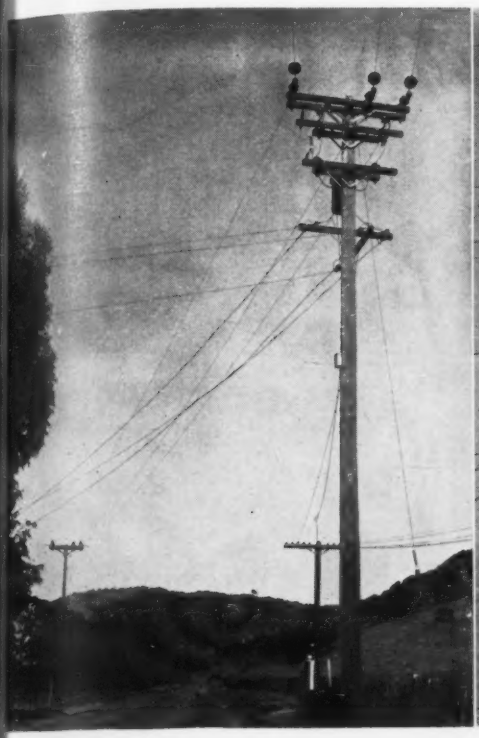
Commercial Bell Telephone service over a *three*-phase rural power line has first been applied in the West to an 11-kv. line of Pacific Gas and Electric Co. near San Rafael, Calif. The power line, about five miles in length, serves several dairy farms, three of which are initial subscribers to Pacific Telephone & Telegraph Co. commercial service. Following successful application of carrier to single-phase rural lines (ELECTRICAL WEST, April 1947, p. 76), this three-phase application, following closely one on the East Coast, blazes a new trail in supplying telephone service via power line to many rural customers that otherwise could not be reached economically.

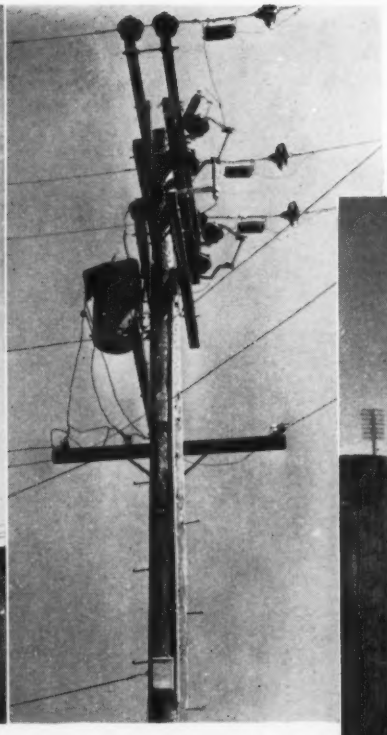
Principle of applying the carrier is relatively simple. At some point convenient to the telephone company, coupling is made to one phase wire of the power line through a .002 mf. condenser, protected by a 1-amp. power line class fuse of the Trip-O-Link type. The carrier operates between this one wire and earth ground, whereas in the case of single-phase lines, the metallic neutral ground conductor is used. This is the chief point of difference between the two and indicates that there can be a problem of securing suitable earth grounds. In this first three-phase application the earth has a fair moisture content, even in the summer, and with driven rod grounds resistances in the order of six ohms were obtained.

The three-phase application also requires considerably more series top line chokes. Accompanying photographs show the several conditions requiring trapping as well as other features of this most recent application.



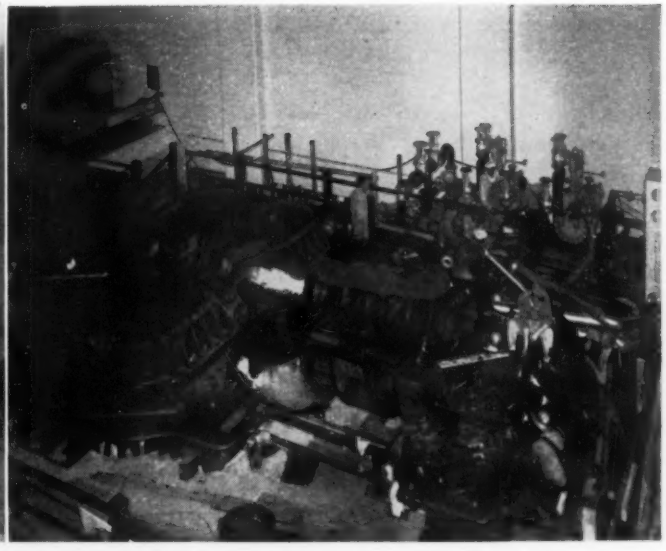
Three-phase tap line from which no telephones are served is isolated from carrier channel by three series chokes





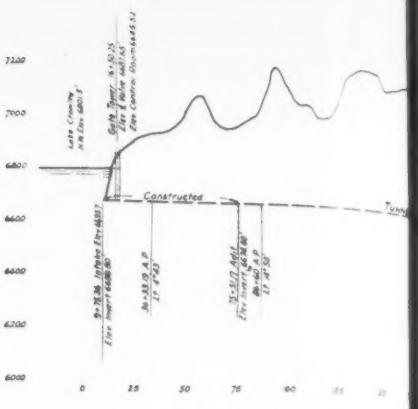
Above left: Take-off pole where telephone carrier is coupled to one phase wire of power line. Common carrier terminal cabinet is shown on telephone pole immediately back of power pole. Above right: Close up of power take-off pole showing series line chokes; 1-amp. fuse, and tube-mounted coupling condenser. Right: Terminal cabinet where metallic exchange circuit (open lead in background) is converted to power line carrier channel

22,500-kw. in 109 Days

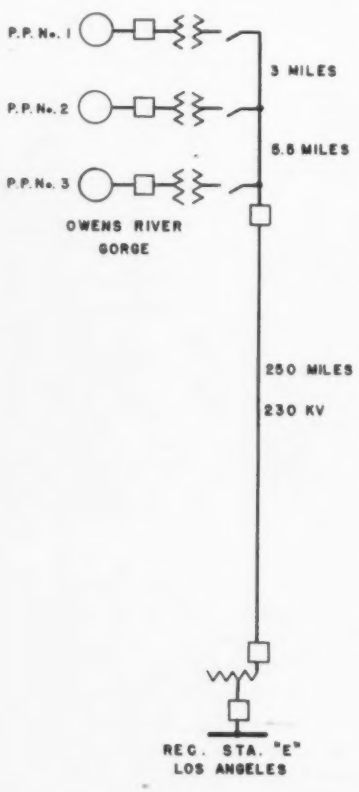


One hundred and nine days from go ahead signal to operation is the record set by Southern California Edison Co. in installing a 22,500-kw. turbine-generator in its Long Beach steam plant. The unit was a second-hand machine originally installed in the Essex station of the Public Service Electric & Gas Co. of New Jersey in 1915. The utility sold it to the Chinese Purchasing Commission for shipment to China, but high cost of converting the machine to 50-cycle operation dissuaded the Chinese and they sold it to the Southern California Edison Co. It is known as unit 7R in Long Beach plant 2, and occupies the same position and foundation as one of the two 50,000-kw. machines removed during the war for shipment to Russia. Insufficient boiler capacity in plant 2 required a steam line to be run from plant 1. Because of a difference in steam pressure and temperature in plants 1 and 2, the unit will operate on an admixture of the two, or about 205 psi. and 525°. The Essex unit provided quickly some much needed capacity

112,500-kw. of New Hydro At Owens Gorge



Unable to wait on politics for another major power development on the Colorado, the Los Angeles Department of Water & Power will start construction immediately on its 112,500-kw., $40,526,000 Owens River Gorge hydro project. Three identical hydroelectric plants will be built to utilize the 2,375-ft. power drop from Crowley Lake to the end of the gorge. Each plant will contain a single unit of 37,500-kw. capacity operating under approximately equal heads as indicated by the accompanying profile map. Eleven miles of concrete lined tunnel, as shown by locating map, including over a mile already built, will be required to deliver water from Crowley Lake to the three plants. Power will be fed into a single 230-kv. transmission line extending 250 miles to receiving station E in San Fernando Valley, near Los Angeles. Kilowatt-hours from Owens Gorge f.o.b. Los Angeles will be competitive with $1.35 oil. Present price is $1.85 per barrel with a discouraging outlook both as to price and supply.

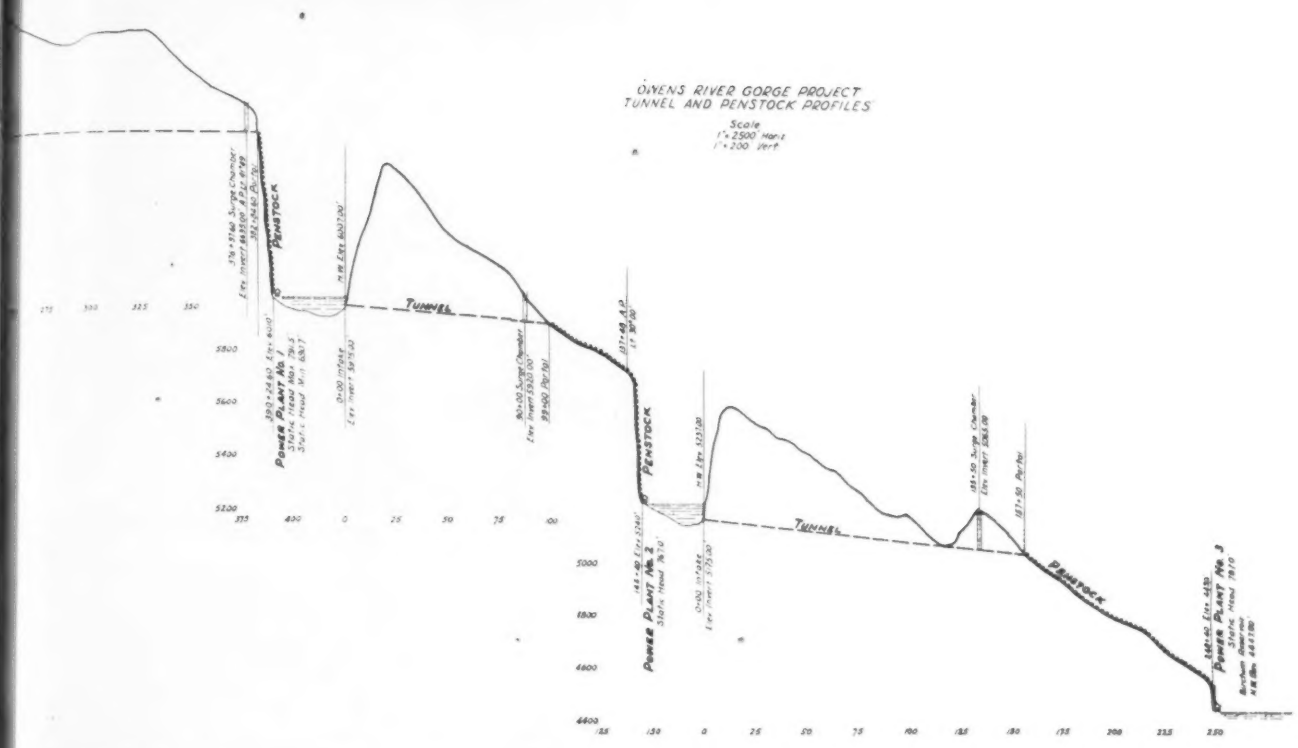


Three identical 37,500-kva hydroelectric plants will be located on Owens River below Lake Crowley in the high Sierras, shown on map

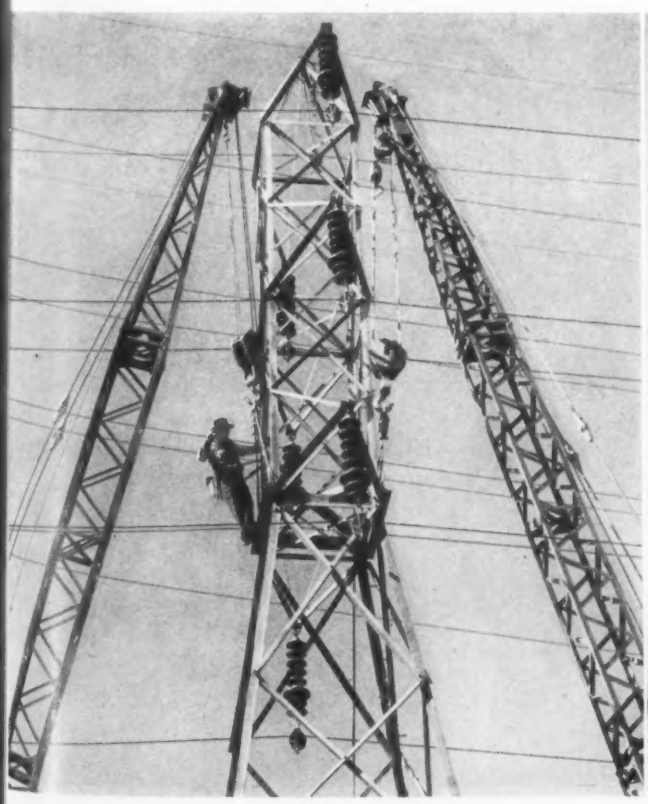
Owens River Gorge showing rugged terrain typical of locations for this project

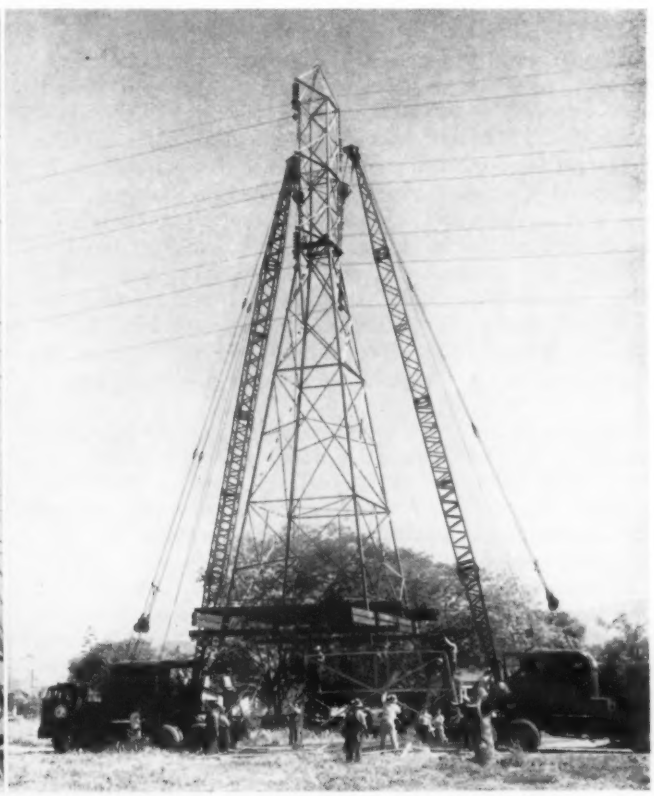
One-line diagram of Owens Gorge transmission system to Station E, Los Angeles

Total available power drop of 2,375 ft. will be divided among three plants as shown in Tunnel and Penstock profile, top of page. Tunnel requires 58,000 ft.



Two cranes bodily move transmission tower a distance of 70 ft. in twelve minutes from unbolting to centering between new footings. This job was recently executed by Alfio Bissiri, electrical engineer, and James A. Joyce, general superintendent of transmission of the Los Angeles Department of Water & Power, when street work required removing the tower. Ground wire was swung clear and 110-kv. conductors placed in sheaves. Two 70-ft. cranes, with hoist lines attached below lower crossarm, were tied together and moved as a unit. The one towards the new location initiated the pulling; the other furnished just enough power to move its own wheels. Heavy timbers at the base were used to keep the tower from being top heavy. Long-boom cranes proved time and labor savers





IRON REINSULATED For 35,000-kw. UNIT IN RECORD TIME

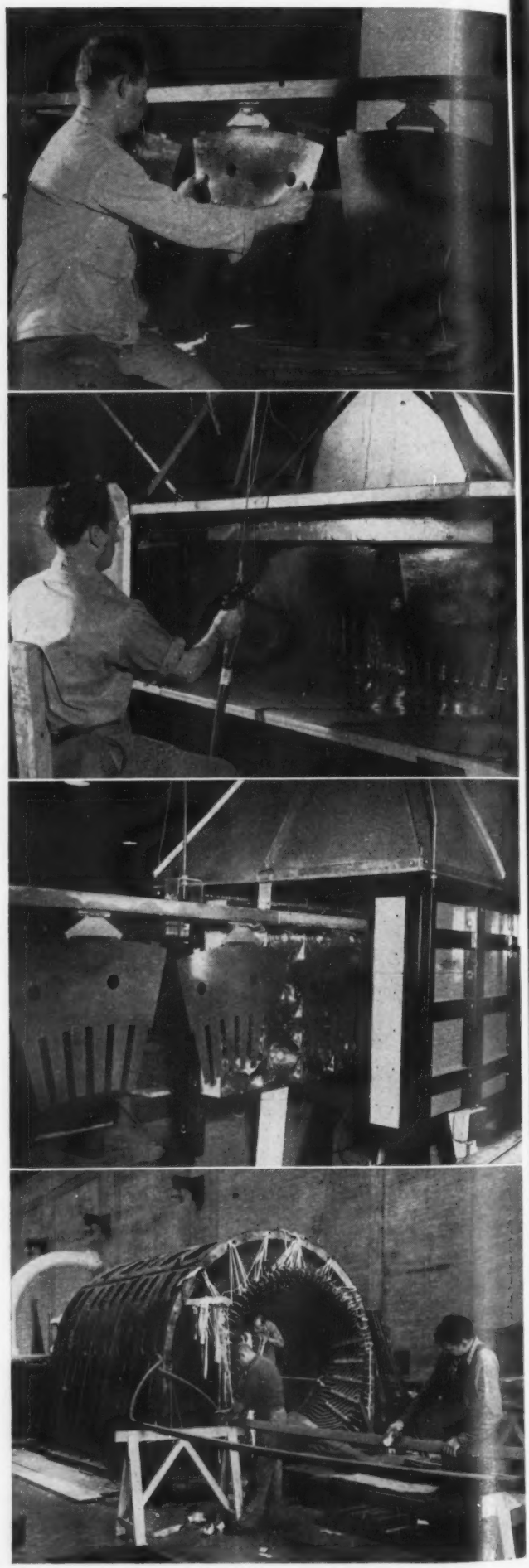
Failure of a large generator can create a real emergency when power is badly needed. This misfortune befell a 35,000-kw machine at the Seal Beach station of the Los Angeles Department of Water & Power on Feb. 24 of this year, when insulation failed on the through bolts holding the stator laminations. Fortunately, the stator winding was undamaged except for the insulation fire caused by molten slag from the burned bolts and laminations.

The winding had to be removed and reinsulated and the laminations had to be completely reinsulated and restacked. The manufacturer was consulted for prices and delivery of new coils and iron. Best possible delivery was 25 weeks for the coils and 53 weeks for stator laminations. Imperativeness of having the machine back in operation for the 1947-48 winter peak led to the decision to undertake the job in the department's own shops.

Experiments and consultation with the manufacturer determined that the best way to reinsulate the laminations was by spraying with a mixture of one part of red oxide glyptal to 1½ parts of thinner without removing the original varnish. A production-line set-up was quickly made to do the job. It consisted of the endless chain conveyor shown, from which the laminations could be suspended while passing through a spray booth and a bank of infrared drying lamps. In the spray booth an ingenious mechanical device gave the laminations a half-turn after they were sprayed on one side. This reduced handling to placing the laminations on the conveyor and then removing them at the end of the cycle—a one-man operation. The spray painter was the only other man required.

Use of infrared cut the drying time from three hours at 110°C in a conventional drying oven, to three minutes at 150°C with the infrared. With this production line on a 24-hour basis, some 85,000 sheets of laminations were varnished in 17 days. Reinsulating the stator coils was a major undertaking in itself, but with technique developed by the Test Laboratory and Shop, including an induction heating set-up, this work also was completed in record time.

In an outstanding example of coordination between divisions and sections of the department and all of those who participated in the work, the unit was back on the line June 28, just four months and four days after a major failure in the 23-year-old machine. Particular credit for this job is due F. R. Gould, shop superintendent, T. M. Blakeslee, testing laboratory superintendent, Clayton M. Allen, engineer in charge of the general plant division.

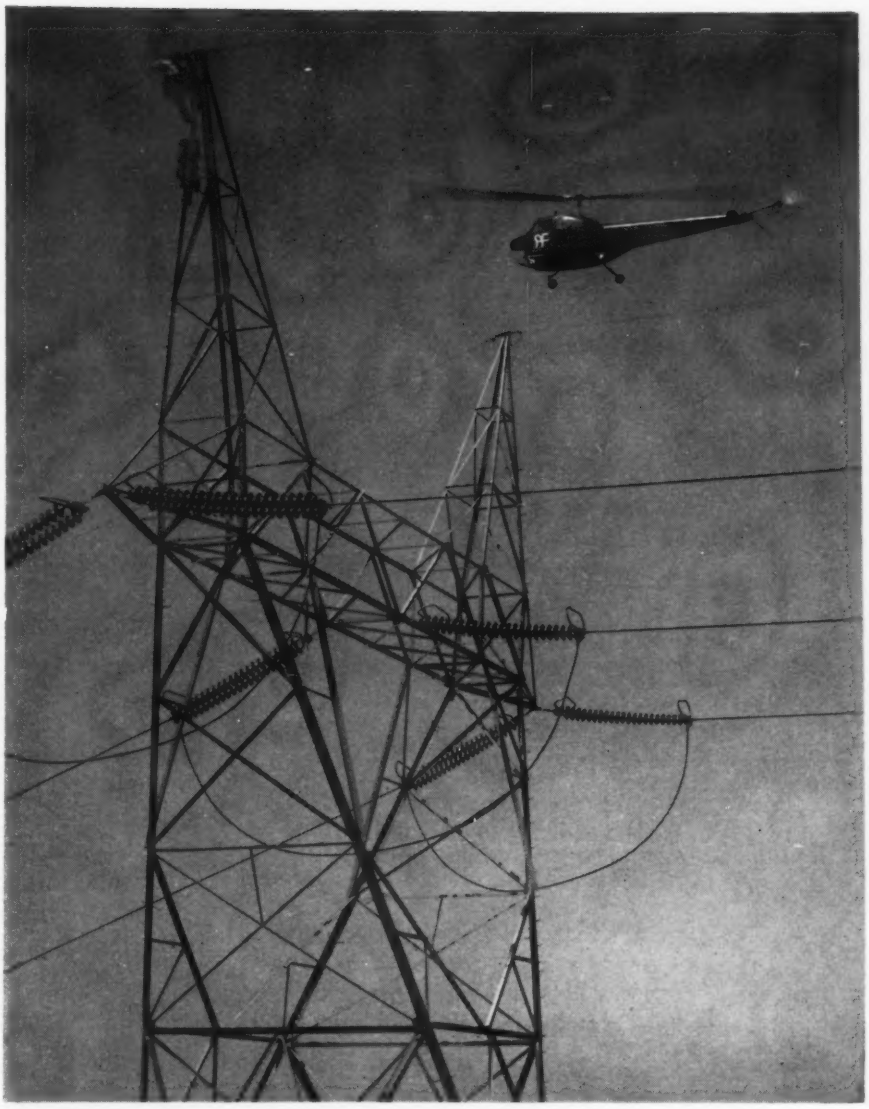


Production-line methods were used by Los Angeles Department of Water & Power in doing a record reinsulating job on 85,000 sheets of laminations from a 35,000-kw. generator that failed. An endless chain conveyor was set up to transport the laminations through spraying and drying operations. Top view shows how sheets were placed on hangers on conveyor. Next is shown the spraying operation, following which laminations were passed between banks of infrared drying lamps as shown. Drying time was cut from three hours in a conventional oven, to three minutes with the infrared lamps. Below: Reassembling the machine. Coordination of departments and cooperation of personnel had a badly needed unit back in operation in just four months and four days after this major failure

Helicopter Patrol

Use of helicopters for transmission line patrol has been the subject of experiment of several West Coast utilities recently and on July 29, the Board of Water and Power Commissioners of the City of Los Angeles approved a contract with the Armstrong-Flint Helicopter Co. for services up to a maximum of $10,000 for "air borne" transportation to be furnished as required over a four-month period. Service at present is experimental, being largely prompted by difficulty of obtaining experienced men for vacation replacement on patrol crews.

Use of helicopters is expected to show particular advantage in case of washouts and other damage when normal road facilities are not available and a substantial saving of man-hours in inspection of upper tower structures and top sides of insulators. Units being used for patrol work will be equipped with carrier radio receivers temporarily so they may be dispatched over transmission line facilities to any other location. Cost of service is $50 an hour for air time, $22.50 for stand by away from home base. During four-month contract period cost studies of helicopter patrol will be compared with normal ground patrol and its worth will be evaluated in terms of cost. It is not expected that there will be any sudden change in present method of patrol, but air facilities may gradually be expanded to augment ground patrol.



National Plan for Frequency Allocations

Through efforts of the Power Utility Frequency Coordinating Committee of the Radio Technical Planning Board, functioning with the sanction of the Federal Power Commission, there has been developed an orderly national plan for frequency allocations that will be mutually advantageous to all licensees in the "Power Utilities" group. The 48 states have been divided into nine groups with regional boundaries as shown. Each region will have its own coordinating committee for clearing applications.

Of West Coast interest are areas 7 and 8. The coordinating committees of areas 7 and 8 have as their temporary chairmen, C. T. Malloy, Southern California Edison Co., and W. A. Leidigh Jr., Portland General Electric Co. Both areas will hold meetings soon to effect permanent organizations.

ELECTRICAL WEST

Customer's Strike

SAID a recent Associated Press dispatch from Mexico City: "Citizens instead of unions struck for an hour last night to compel the electric light company to give better service. Led by the Lions Club, householders pulled switches from 7 p.m. until 8 p.m., buses stopped and movies suspended pictures."

Without any knowledge of the causes for the strike, one can only observe that the customers' protest was unusual in character. An hour's shutdown would represent only an infinitesimal revenue loss. Customers rather than the utility would suffer. Now if the shutdown had happened on the West Coast and if it took place with any frequency there would be general rejoicing among the power companies. That much relief from the power demands that have utilities scraping the bottom of the barrel would be appreciated.

The Payoff on Light

ALL of the years of work and the investments of money made by the electrical industry in the promotion of lighting is beginning to yield dividends. It was heart-breaking work for such a long time, it is highly gratifying now to see come into blossom the effort that was so difficult to seed.

Several things have given lighting a strong boost. The limitations, such as heat and efficiency, of the incandescent light source, have been broken with the introduction of fluorescent sources. These new sources have opened new possibilities for the designer and architect to use light as a part of the design itself. Incandescent lamps themselves have found a new and special use through design of reflector spots and floods, which utilize the point source to great advantage.

The public, too, has learned what high levels of illumination mean through experience with them in war industries. It now expects and demands levels that would have seemed astronomical thirty years ago.

Another circumstance of the times is causing lighting almost to explode into the uses and applications which the lighting men of the educational era worked so hard to introduce. During the war all new construction and remodeling stopped. All of this dammed up desire to reclothe business in new stores and offices is now being given expression—and light is part of it.

Back to Fundamentals

SO home freezers are beginning to run out of the distributors' and dealers' ears here in the West. Instead of being a cause for alarm, this should represent a challenge to the industry's salesmanship. The situation had a parallel 20-odd years ago when the electric refrigerator received its first real promotion. The housewife really did not accept the mechanical refrigerator until she was sold the need for refrigeration in the home. Once she became convinced of this need, the selling job was half finished. The same things holds true today for the home freezer. If the industry would go back to fundamentals and sell the need for home freezing, the conveniences to be enjoyed, the savings that are possible and all of the other benefits, then freezers would begin to move out of stocks into homes. One enterprising Seattle dealer does this and follows up with what amounts to a trial offer—a small freezer is rented. Usually a larger one is sold. That kind of promotion and initiative will sell freezers and prevent distress tactics.

Power Emergency

AN oversupply of electric power here in the West after the war was freely predicted back in 1944-5. So too were general unemployment, a marked decline in national income and a sharp recession in prices. The prophecies were cockeyed in every instance, although for different reasons.

In the case of power supply several things happened to confound the analysts. Few of them believed that the 1,500 war-built industrial plants would continue to operate. And none anticipated that twice this number of new and smaller satellite industries would spring up in the two years following the war. Almost all overlooked the possible effect that 3,500,000 new people would have on electric energy

EDITORIAL VIEWS

demands. Overlooked too was the fact that there had been a four-year lapse in adding new generating capacity. Finally no one predicted that the 1946-7 winter would leave the region with a serious water deficiency.

Through a combination of all of these factors the Far West is confronted with a temporary critical power situation. The advocates of government power are prone to call it a "power shortage." By so doing they hope to restore power appropriations cut by Congress.

It is true that the light and power industry is scraping the bottom of the barrel in an endeavor to meet the emergency. That they have done so successfully merits commendation. That they will continue to do so is a foregone conclusion. In the meantime some 2,500,000 kw. of new capacity is under construction. When the first large blocks of this added supply become available in 1948, there will be no emergency.

Usable Wiring Capacity

IN appliance development the 1,600-watt limitation of the NEC represents a necessary but nevertheless serious handicap. For customer satisfaction, better operating characteristics, speed and convenience, many of today's portable appliances would be better if they could be rated at 2,500 or 3,000 watts. Usefulness and appeal of appliances such as the roaster, the portable heater and the ironer would be enhanced if this were possible. Already the electric dryer, with its 3,500- to 4,000-watt capacity faces a serious sales obstacle because of the wiring bottleneck. And many customers will complain bitterly when their new automatic washers blow fuse after fuse because of the overloads due to heavy current draws at the beginning of the spinning cycle.

Contemplation of these conditions results in certain conclusions and at the same time raises some pertinent questions. Adequate wiring specifications can be altered to insure ample wiring capacity for such appliances in new homes. But in the millions of old homes the No. 14 wire, the low-rated wiring devices and the high cost of installing new circuits are almost unsurmountable handicaps. Could the existing wiring, then, carry greater loads? Isn't this already the case in at least half of the homes? Power company surveys show universal over-fusing of circuits. Under the circumstances could code limitations be relaxed safely?

It would be interesting to hear what the inspectors might say at one of their section meetings in answer to these questions. Both the public and the industry has an interest in the answers.

I WANT to thank God today that I live in America. That I can still speak my own mind and do as I please, work as I please and vote as I please . . . that the way ahead of me is still wide open. Now I know how easily these priceless privileges can be lost. For there is no place a man can stop when he starts trading away his liberties. Step by step it leads into slavery. There is nothing but misery and want at the end of the road when people of a nation split into selfish, quarreling groups and classes. And that has been the law of mankind since the beginning of time. I have a young son and this is what I am going to tell him—If you cannot learn to discipline yourself, there will always come a tyrant to teach you.—It takes spunk and sweat to become a good American citizen. Don't let anybody try to tell you different.—You'll never find peace in any doctrine that preaches violence to prove its point.—You'll never be happy under any kind of government that denies the love of God and the natural goodness of men.—You'll never get ahead in any scheme of life that puts a halter on your initiative and your ingenuity. Above all, beware the man—whether he is a Right, or a Left, or the Middle, or of the Proletariat or whatever label he wears—if he tries under any pretext, to trade you out of any of your rights as a citizen—he is a tyrant, who will take away your liberties, one by one.—From a Nash-Kelvinator Corporation advertisement.

Public Power Assn. Faces System Facts

Business and engineering problems discussed at Longview annual meeting of PUDs and municipals

It is up to the PUDs and the municipal systems either to get the Bonneville Act amended or provide their own sources of supply, Dr. Paul J. Raver, BPA administrator, told the annual meeting of the Northwest Public Power Assn., Longview, Wash., August 14-16, referring to the recent action of Congress cutting Bonneville appropriations. We are charged with a responsibility of serving public power agencies on a priority basis, but under the present set-up we do not have authority to carry out this responsibility, he said.

BPA should be permitted to use a portion of its revenues for needed capital improvements, he believes, instead of, as now, turning in these revenues to the federal government and seeking special appropriations from Congress for such improvements.

It is all right, said Dr. Raver, if Congress wants to change the Bonneville Act but it is wrong for Congress to nullify the act through action of its appropriations committee.

The association has a membership of commissioners and managers of PUDs, municipal power systems and REAs and cooperatives in Washington and Oregon. The meeting was presided over by John S. Dickson, manager of Wahkiakum County PUD, Cathlamet, Wash., president.

Russell Mack, representative in Congress from the third Washington District, Hoquiam, stated that the Congressional action was non-partisan in nature. Opposition to Bonneville appropriations came chiefly from eastern congressmen in both parties, apparently inspired by eastern electric utilities, who were jealous of the low Bonneville rates, and eastern manufacturers, who feared transference of some of their markets to Western manufacturers. We of the West have a big selling job to do on our eastern colleagues, he said.

Ted A. Lloyd, deputy master of Washington State Grange, said that demand for sprinkler irrigation west of the Cascade Mountains in Washington and Oregon would eventually lower the water table. The remedy would be dams on the upper region of the stream, to conserve water for irrigation and power. The only answer, he said, to working out such a program would be a CVA.

Jack R. Cluck, PUD attorney in Seattle, told the meeting that in PUD administration there should be a sharp line drawn between the functions of the policy-making board and the management. There has been a common error to mix these two functions, he said, and he made a plea that appointed managers be left free to exercise the management function without interference from the Board of Commissioners, and conversely that management not usurp the policy-making functions of the board. The civil service principle, he said, should govern the personnel under the management. Jerry Winters, local representative of the IBEW, urged PUDs to apply for inclusion under the new state law in Washington, providing for a retirement for state employees and employees of any political subdivision. He said two of the principal fears of employees, loss of job and sickness, were provided for through state unemployment insurance, hospitalization and sickness provisions, and that the establishment of a pension under the state act would take care of the third fear, that of old age.

Burnell Carnine, chief accountant of Cowlitz County PUD, put in a plea for more accurate accounting by public power agencies of their plant account, being sure to get into the account not only the actual cost of labor and materials of new construction but also the overheads attaching to labor and materials through pay roll and stores charges. Such accounting is needed, he said, for accurately accruing depreciation and retirement reserves, and it has important bearing on rate making, plant extension policies and the meeting of bond requirements.

Proposing a creation of a permanent joint pole committee to study the joint pole problem and write a uniform agreement for public power agencies and telephone companies, Paul Peyton, superintendent of lighting, Centralia, Wash., brought out that present agreements were at wide variance and frequently not scientifically arrived at.

Technical discussions were brought to the meeting by several suppliers' representatives. S. B. Crary, General Electric Co., Schenectady, pointed out that electric system development generally went through three phases of emphasis: (1) extension of lines to new areas, (2) strengthening the reliability of the system, and (3) reduction of cost. Though these three go hand in hand, he said, he felt the PUDs were largely in the second phase of development, which gave opportunity for ingenuity and judgment. He showed how system reliability could be improved through proper layout of additional lines to get the maximum increase in capacity at a minimum investment.

W. W. Sproul, Westinghouse Electric Corp., Sharon, Pa., discussed new developments in transformers, citing

Moore Raver Dickson McGuire Hurd

the advantages of the new CSPB distribution transforms having built-in lightning protection and internal thermal protection. These transformers can be loaded by copper temperature and permit the economies coming from safe secondary banking, he said. In the case of power transformers, he said, the trend was toward three-phase units in place of three single-phase, and also toward forced-air and forced-oil cooling or a combination of both.

W. M. Dusenberry, Line Material Co., Salt Lake, told of trends in street and highway lighting, pointing to the tremendous job to be done in this field which was so badly neglected during the depression and the war. Consideration should be given to mounting lights at proper heights to eliminate glare. The trend is away from gas-filled lamps toward incandescent, though mercury vapor lamps still have a place in the picture.

In a discussion of the materials situation, Albert Lane, General Electric Supply Corp., San Francisco, said the copper shortage is much improved and should be practically caught up by the end of this year. This is in large part due to the removal of the four-cent tariff on imports and to the allocation system employed by suppliers. ACSR and copper-copperweld composites, and distribution transformers will remain in short supply for some time. Certain insulators are likewise in this category, while pole-line hardware, poles, crossarms and guy strand are rapidly catching up on the demand.

R. E. Kistler, Pacific Telephone and Telegraph Co., Seattle, reviewed the progress of carrier telephone development over rural power circuits as exemplified in the Cleelum, Wash.. experiments, and as reported in ELECTRICAL WEST for April 1947.

Thomas L. Matney, chief electrical inspector, Department of Labor and Industries, Olympia, put in a plea for support of the department in securing better inspection legislation including sales control to eliminate substandard electrical merchandise from the market in the state of Washington.

An open forum led by V. B. Jones, city lighting department, Tacoma, took up the question of working 7,200-volt branch circuits hot with live-line tools or rubber, under union agreements.

Clinton T. Hurd, manager, Cowlitz County PUD No. 1, Longview, Wash., was elected president of the association for the coming year. R. B. Boals, superintendent, Eugene (Ore.) Water Board, was elected vice-president, and John R. King, Seattle City Light, was re-elected secretary-treasurer.

The association created at this meeting the Milton Hunt McGuire Award for engineering accomplishment, and made the first award to Hugh P. Currin, engineer of the Eugene municipal system. The Currin citation called attention to his early use of long-span, wood-pole transmission line construction, pioneering in the electric steam boiler for stand-by service, and original design of a-c calculating board for circuit analysis on small systems. McGuire is the veteran manager of the McMinnville, Ore., municipal system, and was vice-president of the association.

Chapter Servicing

A new chapter servicing program has been announced by the National Electrical Retailers Assn. in order to make more effective at the local level the national program undertaken by the organization. The servicing program started in August with suggested plans for meetings to be held by committees of local retailers with their distributors to discuss in a friendly fashion the problems of distribution in that area.

The program includes instruction to chairmen and secretaries of local chapters from Cliff Simpson, managing director in Washington, D. C. It sets up a program for August of meetings about the middle of the month on distributor relations, and for September on the subject of franchises with some analysis on the cost of doing business. The October meetings will be directed toward a recognition of NERA and from a business efficiency and sales promotion standpoint the promotion of Radio Week, Oct. 26-Nov. 1.

To instruct many local chairmen and secretaries who may not have had experience, suggested outlines of advanced separations are furnished for such meetings and for chapter meetings of the membership. There is even a bulletin, *How to Conduct a Chapter Meeting*, which contains many constructive and logical suggestions.

● RETAILERS of the Watsonville and Santa Cruz marketing area held a meeting Aug. 4 at Watsonville Chamber of Commerce building to discuss formation of a local chapter of the National Electrical Retailers Assn. Elmer J. Weinheimer, Western division regional director, was the principal speaker. Chairman of the meeting was John Merton Carlyon of Watsonville. The secretary appointed was Laurence J. Hall of Watsonville.

● A. E. FLEMING, General Electric Supply Corp., Salt Lake City, was re-elected chairman of the Utah Chapter Illuminating Engineering Society for the fiscal year beginning Oct. 1. Wayne L. Shaw, Utah Power & Light Co., was named secretary-treasurer and on the board of managers are: Dean N. Jenks, General Electric Co. lamp department; J. Vernon Sharp, electrical contractor; and Morris P. Buswell, Westinghouse Electric Mfg. Co.

● DR. MATTHEW LUCKIESH, General Electric Co. lamp department head of research and engineering, is scheduled to address a special meeting of the Southern California Section Illuminating Engineering Society, Sept. 22, at the Edison Auditorium, Los Angeles. He will present his IES convention paper, *Footcandle Levels—Thresholds, Recommended, Optimum, and Ideal.* The initial Sept. 5 meeting of the section is a smoker and installation of officers with past president George Rankin officiating. Don Grandey, Southern California Edison Co., is to be the new chairman of the section succeeding L. W. Luley, Westinghouse Electric Corp.

● FORMAL INSTALLATION of the new officers for the Washington State Chapter Illuminating Engineering Society, will be held in the first meeting in the fall when Emory Branch will take over the chairmanship from Bert T. Heinz. Branch is with Puget Sound Power & Light Co., Heinz, a manufacturer's representative. Other officers elected were: Ken Hollingsworth, re-elected secretary-trasurer, Elmer Favro and Earl Gilpin in addition to Heinz on the board of managers. Last meeting before the summer recess featured talks by Dorothy Constans, interior decorator for Frederick & Nelson, Seattle department store, who criticized many lamp designs both from the standpoint of beauty and lighting effectiveness. Margaret Hyland, home service representative of Puget Sound Power & Light Co., presented an illustrated talk on modern home lighting using colored slides of typical installations. A new associate member, Miss Mary Lund, an architect, was introduced.

● CANCELLATION of many building projects, particularly in a residential field, is noted during the past three months in the quarterly report just issued by the Electrical Service League of British Columbia at Vancouver. The high cost of labor and materials and shortages are blamed for this condition. The league has appointed a new office manager and field representative, Mr. Kievill; is assisting in the organization of a plumbers and heating contractors association; working in close cooperation with a newly formed inspectors group. The Victoria division is endeavoring to organize the electrical industry with a new electric club as its medium of social contact.

SIGNIFICANCE of MARKET WEEK in San Francisco

Significances of an event often emerge after the event itself. Highlights of Market Week early in August were reported in brief in the August issue's Sales Guide News Letter. Here are pictured some of many exhibits, together with comments on significances of the Market to retailers, digested and assimilated

"TRADER" Jerry Schuyler, partner in Schuyler-Wilson was right in the tropical atmosphere of the Gatti-Hallicrafter worldwide expedition in exhibiting deluxe models of Hallicrafter's radio with FM, AM and time-clock controlled wire recorder to John Nakken of Epperson's, Woodland, Calif. Clarence Price of Schuyler-Wilson in Sacramento had just been explaining its details. This was the first built-in wire recorder shown in the West

MOST spectacular exhibit is that of Westinghouse on one corner of the new building, fourth floor. Above is one portion of it, containing a fully operating electric laundry and kitchen. Lois Ferris, home economist for Westinghouse, showed customers the Laundromat (right) and Letty Werner, home economist for Westinghouse Electric Supply Co., San Francisco, the new Waste-Away unit. Remainder of the large exhibit featured the entire line

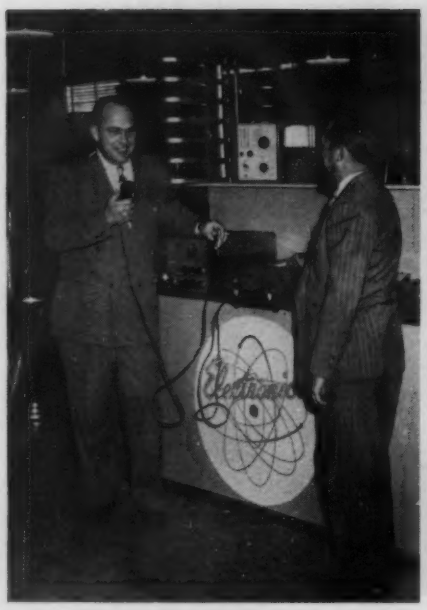
HOTPOINT expanded its coast headquarters in the Mart. In it are seen Lou Fryer, Graybar, Fresno, (center) at the new flatplate ironer. Left is W. E. Garrison, service manager, soon to become director of dealer development for Hawaiian Electric; Mrs. Geri Furst, home economist for the West; V. E. "Buzz" Koch, district manager for both San Francisco and Los Angeles districts; W. E. Derbyshire, Graybar, San Francisco Hotpoint man

COLORFUL Kelvinator-Morton-Fowler electric kitchen, being shown to Pauline Macki, Bonsers Jewelers, Oakland, and Mrs. Nona Poole, by R. L. Winegarner of Kelvinator. Kelvinator in the West is tied in with Morton Kitchens for cabinets, and Fowler (of Portland), water heaters, while it supplies range, refrigerator and home freezer. Fowler's new table-top model water heater is used in this kitchen ensemble; Kelvinators deluxe model range

UNIVERSAL'S full line (Landers Frary & Clark) was shown at the Mart in one half of Thompson & Holmes expanded exhibit, which housed the Philco line in what used to be the display space. Offices of this distributor were temporarily housed in the Mart until a new building was built. The Mart will still be its chief point for exhibit of the lines carried—Philco, Universal, Proctor and Sunbeam, as well as gas ranges and oil burners and Nu Enamel paints

GENERAL Electric Supply displayed more than its parent company's lines in the brightest exhibit in the Mart. The General Electric home appliance line was prominent of course, and here Warren Vogel, G-E Supply, was showing the new automatic home laundry to Pearl Schroeder, of Schroeders' Sacramento. Another part of the display featured farm electric equipment, welders, feed grinders, chicken pickers, etc. Another section showed oil heat

PRESIDENT of Electromode Corp., Charles R. Ogsbury of Rochester, came West for the Market, conferring at the Russell & Co. exhibit with the Electromode representatives of the West who visited too. Helen Norris of Russell & Co. was hostess to visitors and made use of the display board which later will tour the West as part of a huge advertising and promotion drive. Russell & Co. also showed the Nesco and the F. A. Smith fan lines



WEBSTER wire recorder had its first hearing at L. J. Meyberg exhibit, along with Norge, Bendix, Eureka, Domestic and others. W. R. Willis of Modesto tried his voice on it; Kenney Ross of Meyberg was technician pro tem

ADMIRAL'S Pacific regional manager, Harold Conklin, is no stranger to the West. Nor is the distributor for Northern California, J. T. Barrett, Kaemper-Barrett, San Francisco (left), and the new radio won't be either

NEW dishwasher with built-in water heater, the Dishamatic, attracted attention at the Dalco Appliance Co. exhibit. C. C. Brennan explained it to F. T. Russell, Macsons, San Mateo, aided by Ted Smiley, also of Dalco

THE market was significant for the few *new* things shown by comparison to previous markets. This would indicate that manufacturers are putting all effort into supplying *enough* of the standard appliances rather than attempting to introduce new ones.

Dealers seemed to do more critical and comparative buying. There was no first-day rush. Dealers took their time, examined, dismissed, tried out operating appliances before ordering. Orders showed a sensible regard to inventories and the dealer's appraisal of his own customers and trading area. Some distributors said dealers they'd talked to reported their inventories were down. They had eliminated a lot of "cats and dogs" and were replacing with stable lines and better brands.

More appliances proudly display the Underwriters' Label—a recognition by more manufacturers that the West wants this assurance of safety.

Deliveries are better. The freight jams of earlier in the year seem to have been broken and the flow of goods westward or north and south, is freer. Manufacturing rate has been stepped up, too.

Prices edged up a few per cent again beginning Aug. 1, due to steel and wage increases. Though no one can predict very far into the future these times, many manufacturers' men said the factories were trying hard to soak up these increases without affecting the selling price, realizing that the higher the price, the harder it will be to sell appliances to the public. There was hope, too, that if the steel wage settlement means uninterrupted production of steel, many manufacturers who have had to buy steel from brokers at inflated prices plus fees, should be able to get steel at the market price and thus cut manufacturing costs, and improve plant efficiency. Firmer prices on the part of suppliers will help stabilize prices on finished appliances, too, they said.

Freight rates, though, may go up. Railroads have petitioned for increased rates.

In some lines better margins for dealers began to appear. It may be the beginning of a trend.

There were fewer newcomers seeking franchises and less inclination by distributors to offer much hope of granting more. This indicates a trend toward tightened franchising. The old question as to who would be the first to eliminate seems to be answered. Distributors are making the first move.

Changes in personnel seem to be continuing. This is at all levels. Many visiting dealers said they never knew who they'd meet in some other manufacturer's or distributor's display—meaning they'd changed affiliations. Some wondered what affect these changes might have on policy—especially in the top brackets. As things tighten up dealers become more sensitive to the manufacturer's policy, talk more about it.

Water heaters seemingly have reached the surplus stage. Dealers complained of more tie-in deals, requiring them to take so many water heaters if they were to get a range or refrigerator. They said this pressure would cause dumping and collapse the price.

Ranges are still short. Westinghouse, G-E, Hotpoint, Kelvinator, Electromaster, Presteline, Frigidaire are moving up on demand. By concentrating on one or two deluxe models Crosley, Universal, Thermador, Gibson and others are getting improved supply.

Refrigerators of the best known makes, except Frigidaire and Kelvinator, seem to be coming slowly yet, distributors said.

Christmas merchandise—traffic appliances, clocks and others will be in much better supply than last year, with a few shortages of the best known brands. There will be plenty of electric heaters, probably more than the power shy utilities of the West would like to see this coming critical winter.

Such were impressions and opinions from the summer market. Attendance, George L'Amoreaux, Western Merchandise Mart promotion manager said, was bigger than at any previous summer market. The additional space absorbed the attendance more easily and made it seem less crowded. The Western Market, next February, with all exhibitors "settled" and fully equipped should be even better and bigger.

Damaged in Transit—Who's to Blame

Some impressions about the problem of damage to refrigerators, ranges, radios, and washers en route from eastern plants to consumers on the Pacific Coast. An Electrical West field investigation

WITH appliance shipments to the Pacific Coast still well below the ood necessary to fill wants of consumers who have been wearily waiting for any months, appliance people report hat discouraging percentages of averge shipments arrive in such damaged ondition as to be undeliverable. In ddition to maddening delays in delivery, wholesalers and retailers alike omplain that they are put to much xtra expense in multiple trucking and andling as well as disassembly and reassembly involved in replacing damged parts and making minor repairs. lthough claims are reported as being elatively freely settled, they seldom ully cover the costs involved.

The graveyard. One San Francisco appliance retailer has this unlovely group (above) of 28 ranges, 16 washers and one ironer tied up waiting for new panels or other parts to replace those damaged in shipment. Estimated conservatively, he has $10,000 in appliances (including $2,500 in refrigerators not visible) continuously unsalable

An insight to the magnitude of the problem can be had from a spokesman like E. W. Powers, superintendent of freight protection, Southern Pacific Co. Speaking at a spring meeting of the Pacific Coast Transportation Advisory Board in San Francisco this year, he pointed out that the claim bill against rail carriers for 1946 came to $100 million as contrasted with $23 million in 1941. Separate figures for the Pacific Coast are not available, nor is it possible to obtain comparable statistics for the two years covering specific appliances from the four major ones selected for consideration here. Classifications, which are established by AAR (American Association of Railroads), the reporting agency, have been revised and the groupings are different.

Among the individuals contacted on the subject by ELECTRICAL WEST, however, there was no one to say that shipment damage affecting him was not

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laving heard considerable numbers of gruesome tales about damaged major appliances, the editors of Electrical West undertook to talk with esponsible people in rail, truck, and ater freight carriers; electrical wholelers; appliance dealers, and warehousemen to get and report informaion as to the severity of the problem, the apparent factors contributing to it, and any available suggestions bearing on improvement. Because of the complexity of the situation no effort was made to obtain or extract statistical generalizations. These are simply impressions from people in a position to have significant information and opinions and, incidentally, to have numerous and obvious reasons for wishing to remain anonymous. It is the sincere hope of the editors of Electrical West that some of the ideas reported may in various indirect ways assist in getting larger quantities of still-scarce appliances safely into the hands of eager Pacific Coast users and reduce a needless economic loss

appreciably worse than prewar, although some of the group had to say so on the basis of records left by their predecessors or comments by associates because they were not continuously in their present jobs. Of those who could put a figure on the increase, a rail traffic man said 35%, a warehouseman said 40%, a factory branch man said their worst damage to date was 36 washers in a car of 80. Their regular average runs 5 to 6% now. Before the war, a damaged washer was so rare as to be an event. An electrical wholesaler said 40% of his large radio consoles arrived in damaged condition. His records since May 1946 listed 400 additional units with indications of damage on the outer package. Most of these went through as damage claims at an average of $30 each for refrigerators and washers. Range and radio repairs were less only because of a company-owned repair shop which handles these two appliances. This large amount of damage was in no small way affected by the fact that one car of refrigerators was in a railroad wreck and suffered a very high mortality.

What Kinds of Damage Occur?

Without exception, external or appearance damage predominates among the concerns contacted. Reports of mechanical or electrical functional injuries were rare, one of the few being from a factory branch of a leading radio manufacturer. Here, the specific difficulty was a high incidence of misaligned tuners but the service man who had made the corrections testified that most of the trimmer adjustments had been in error upwards rather than downwards as might be expected if vibration in transit were the cause. This led him to conclude that inspection errors or climatic variations were more likely to be the origin of the trouble.

As could be predicted, appearance damages of the kind reported were much more frequent and serious on appliances bearing porcelain-enamel surfaces. Thus ranges, as can be seen in one of the illustrations, formed a large part of the total in those warehouses handling all kinds of appliances. Most of the carriers' representatives, on the other hand, said they had observed no difference in the incidence of damage to different types of units. However, many of the new refrigerators and washers are beginning to turn up finished in porcelain enamel so any difference from that particular reason may shortly be less apparent.

Besides being brittle and subject to shock damage, porcelain-enamel surfaces present an exceedingly difficult job of repair. Several companies make a practice of removing damaged panels and sending them to refinishing specialists who restore the injured sections in very presentable condition. Other concerns, however, distrust such repairs on the ground that they look fine at first but turn yellow with age.

Effects of impact in transit. Yet these containers are considered very good in terms of current technique. Opposite: Highly successful English type of packing for delicate china may offer possibilities in principle. The packing floats within resilient framework of woven sapling

Final sale prices are usually cut on units with these patches but this may depend on the location of the damage and whether it is noticeable to the customer. Many units, particularly radios, are coming through with relatively crude factory-damage repairs and some contacts feel that things are slipping by now that might not in normal times.

What Causes the Damage?

If you listen to the appliance and warehouse people, rough handling by rail carriers is the chief offender with particular and specific reference in many cases to humping of cars. If you listen to the carriers, inferior packaging and witless loading of cars by shippers are high on the list. We listened to both and here are some condensed individual points of view.

Warehouseman—radios and refrigerators. Humping causes most damage. Sometimes poorly packed stuff comes through better than well packed. Partial cars (half unloaded at intermediate point) get a bad beating becau the first consignee has no particul care or responsibility for safe arriv of the remainder of the shipme Neither appliance is more susceptib to damage, both come in combinati fiber and wood crates, none open co struction. Dunnage (lumber laid top of bottom layer of merchandise shipping to distribute weight of upp layers) is frequently omitted and lo ing is higher and heavier than norm with units laid sideways on top. T usually causes trouble because un aren't designed to travel on their sid In fact cases are plainly marked f top-up shipment.

Traffic man—railroad. Quality packing varies widely among the shi pers using the company's facilitie several of which are concerns new the field and understandably uns phisticated about crating of produc and loading of cars. Incompetent pe ple, hired during the past labor-sho age periods, are still holding do jobs with shippers, rails, and consig ees. They are gradually being elim nated but their awkwardness shows in such things as shipment damag One day, this individual stood in l local hardware store and watched clerk unpack two ranges, damagi both in the process. He suspects a of this kind of thing gets claim against the railroad as a convenie whipping boy.

Appliance retailer. Most of the dam-
ge he sees happens right in town.
ombination of poor coordination of
cilities by trucking companies and
ck of care by drivers causes a lot of
fficulty which they partially solve by
nding their own trucks after many
ipments. Example of poor coordina-
on is the arrival within an hour or so
two trucks from the same company.
irst to arrive is a large truck with
echanical lift equipment and two
en. It delivers a small package of
irons. Next comes an old high-bed
b with two large refrigerators for
e driver to wrestle off by himself.
his merchant sees wide variation in
cking materials from different man-
facturers.

Factory branch manager—washing achines. Humping of railroad cars mes first on the list of damage pro-
ucers with careless warehouse han-
ing next. Immediately after the war the worst of it partly because they are an awkward size and shape for their weight and difficult to load onto and unload from a hand truck. Refrigerators, which are as heavy, are taller and give better leverage. Almost all damage is appearance damage. Crating now seems to be generally good.

Traffic manager — truck line. In cases where the packing is up to standard, damage is now no worse than prewar. Packing shortcomings are green lumber which causes chemical damage to contents and low-grade lumber which fails to protect. Another kind of damage is chafing of the appliance surfaces by light vibratory contact with the inner surfaces of the package and happens in transit.

Damage reduction manager—steamship line. Up to this time ranges are the only major appliance to arrive here by water and they came through in first-class condition. Speaking generally, the stevedore contractors who unload the ships are a bit rougher than they were prewar and damage and pilfering have increased.

oor packing materials and inexperi-
nced personnel combined to produce particularly serious situation for this rganization but this has now been rgely corrected. In normal times, use f water transport in coastwise ship-
ents helped to keep damage down ut his company is not using this now ue to chronically delinquent position f deliveries.

Appliance retailer—all types. Most amage is due to careless handling ather than rough transit. Ranges get

Warehouseman — refrigerators, ranges, washers. Damage has been cut 90% since the immediate postwar period but is still worse than prewar. Appliances arriving by truck seem to be in best condition, water next, and rail last. This may be because truck shipments get only one handling. Rail carloaders tend to move to better paying warehouse jobs as they gain experience, thus leaving rails always with relatively unskilled hands. Much cheap packing material is coming through but a definite improvement can be seen from immediately postwar.

Factory branch—radios. Packing is as good as ever but there is half again as much damage as prewar. Mainly it appears to come from inertia where either something hits the crate or the crate hits something else. It shows up mostly in nicks and scratches. Electrical damage is small although numerous receivers have been arriving in poor alignment. This seems to be attributable to other reasons than shipment, as mentioned previously. Considerable trouble has come from cars partially unloaded before they reached here. Original bracing may no longer be adequate with part of mass support gone, nor does first consignee seem to care about strengthening it. Some cabinets have been turning up with warped doors and panels but most indications are that green lumber is being used rather than that the shipments are getting wet en route. Some of their worst damages are caused during store-door deliveries by one-man truck. In one case a salesman was calling on a store and reported seeing such a shipment dropped a couple of feet by the trucker.

Warehouseman — all appliances. Damage is less than it was six months ago but worse than prewar and mainly due to banging received by cars. Car width varies, making the loading irregular and indicating that the shipper is not getting any choice in car size as used to be the case. Irregular loading results in excess space which allows motion. Crating and loading appear good and train crews observed are experienced but there is an air of extra rush and carelessness that undoubtedly results in damage. No one appliance gets more damage than another.

Appliance retailer—all types. Only redeeming feature of a bad damage situation is that claims are paid with less difficulty than formerly. Damage reaching here, about 50% worse than prewar, is largely concealed because the obvious injuries are eliminated beforehand by wholesalers. Most is appearance damage with ranges getting the worst, possibly due to open-type crates used. No eastern radio consoles have been received yet. Range damages have been patched in some cases and the units sold at cut prices but such repairs tend to turn yellow. Lot of damage is due to the fact that workers are not yet afraid of being fired. Some inferior packing has come through but oddly enough much of the worst damage has been inflicted on the

best packed goods and shoddy packages have arrived unscathed. In several cases there has been "pattern" damage where several ranges had almost identical blemishes in the same places.

Damage reduction manager — railroad. Too much discredit should not be directed toward the rails. Statistics are loaded by depreciated value of the dollar, by volume of movement, and by inferior packing so common today. Rails admit presence on their pay rolls of war-hired incompetents who are being weeded out as fast as possible.

Wholesaler — all appliances. Train wreck caused a lot of the 400 damaged packages in last year. This figure doesn't include radios, 40% of the large consoles being damaged. Nor do all damaged packages contain damaged appliances. In 1946 green packing lumber and the shortage of packing materials caused the biggest problem but this seems to have cleared up now. One refrigerator shipment was sent in simple wrapping paper on an experimental basis. The units arrived in excellent condition except for minor finish scratches where the string went around the base to hold the paper on. Company has policy of no workable salvage—meaning that units are either repaired with new parts or junked, but not patched up and sold at a discount so they might discredit trade name. Most damage to appliances is not functional.

Many of the individuals interviewed volunteered ideas about things that might be done by shippers to reduce damages to a more reasonable level. Here are some of the more promising suggestions:

In the Product

Consider possible design changes which might make the product less susceptible to damage. As an example, one consignee has noticed that much range damage occurs at or near the points where the tops are pulled down to the sides of the envelope with bolts, suggesting that a small additional stress here exceeds the limits of the material. Use of resilient washers or other means of lessening or distributing the stress might greatly increase the percentage of ranges arriving undamaged.

Addition of a plated trim band on some appliances might prevent damage by the carton rubbing on flat surfaces. And so forth.

In the Packing

Utilize the services of specialized engineers available on many carriers for analysis of packing troubles. American Association of Railroads has a freight loading and container section at 59 East Van Buren, Chicago, Illinois.

Study your packing and that of other similar products. Some carriers have data files with photographs and details on good and horrible examples. Particularly analyze "pattern" damage. If many units are receiving identical injuries, investigation may disclose a single remedy which will cure a large percentage of damages.

Be certain that crating is adequate, not only for the initial shipment by rail or water but also for the additional handling and reshipment to final user which must take place later. In well-packed carload shipments, each container helps to support its neighbors. Going by truck to the retail dealer or customer it has to be able to stand alone. In particular, here are some suggestions:

1. Watch for clearances between cartons and contents which may result in abraded surfaces. Crepe wadding appears to reduce surface rubbing.

2. Be sure appliance is securely bolted to base or foundation side of crate.

3. Look out for curled ends of steel straps that can cut through fiber containers and product finish with constant vibration encountered on trip.

4. Use enclosed containers. Products in open crates are easily damaged by any projecting object coming in contact with finished surfaces.

In the Shipping

Enlist the cooperation of your consignees in reporting the details of damage so you can get full information on which to base analyses leading to its cure. In this connection remember the old proverb about the value of a photograph.

If you go in for partial-carload shipments be sure your first consignee will play ball with you and your second consignee in the matter of putting the car in condition for further travel after he unloads his part of the shipment.

Give a lot of thought to container markings in view of the large number of inexperienced people reported to be handling shipments these days. Give clear indication of the side designed to lean against the hand trucks if that makes any difference to you. Be sure arrows intended to point upward say so. One leading radio manufacturer merely provides a huge red arrow on each side of the package. Experienced freight handlers know that his conventionally means up. But how would a green hand know?

Mark cars "Do Not Hump" if you can afford to take a chance on some extra delays. Several cynics expressed doubt whether any attention was paid to such markings but the majority felt that it might help, couldn't hurt.

Post a sign in your shipping department bearing anther proverb familiar in traffic circles: *A Shipment Well Packed Is Halfway There.*

New Showroom

Designed and planned from the standpoint of greatest service to the electric appliance dealer, the new General Electric Appliances Inc. showrooms and warehouse facilities at 150 West Jefferson Blvd., Los Angeles 7, were formally presented to dealers throughout southern California.

A display room equipped with a complete operating kitchen and a laundry, a large warehouse area (25,000 ft.) for testing and storing all appliances received, classrooms for dealer instruction and later for instruction of service personnel in the dealers' organization, adequate office space (13,000 ft.) for complete accounting and other managerial operations, were thrown open for inspection.

Of particular interest was the spur track accommodating three standard freight cars and the loading ramp where six trucks may be unloaded and loaded rapidly in order to give the dealer quick-as-possible service, and also the more than adequate testing facilities which will insure that every appliance coming in is tested before being turned over to dealers.

Branch manager of the area, from Santa Barbara to the Mexican border and east to Blythe, is S. B. Maher. George A. Lloyd, sales manager, and Howard Johnson, operating manager, assist Maher in servicing the 220 dealers in this area, which is about one for every 25,000 of population. Fred G. Schreiber is manager of advertising and sales promotion.

FM Station

San Luis Obispo is getting a new FM broadcasting station. Valley Electrical Co., operated by Mrs. Jacobson, has owned and operated radio station KVEC and AM stations in San Luis Obispo for a good many years. New FM equipment is being installed at the station and in the broadcasting studio a model kitchen is to be installed and a display of appliances. The studio is at Mountainview and Hill Sts., and contains two separate broadcasting studios in the building. The model kitchen will be used for home economics broadcasts and similar events. Valley Electrical Co. does all of its own advertising over the radio station.

NEWS

ELECTRICAL WEST Sales Guide

NEWS LETTER FOR THE ELECTRICAL MERCHANT OF THE WEST

September 1947

It's getting to be an old story, but steel shortages idled the production lines again last month. It was so bad that even gas range production stopped, imagine that. After a holiday to let stockpiles build up enough to support more production the factories started up again after Labor day. Effect of this holiday will be felt next month at your end.

© Whoa!

Christmas tree lights are going to be short again this year. Although producing at the capacity of small lamp making machines there aren't enough for the demand even of the set manufacturers.

Twinkle

With its first million sold, Bendix Home Appliances aims to maintain its lead in the automatic field by going after the second million with a huge nationwide sales contest, offering a million dollars in prizes. Westerners Sam Kahan, of Phoenix, L. E. Starkweather and A. H. Meyer of Meyberg, Los Angeles and San Francisco, E. S. Carter, Harper Meggee, and R. F. Meggee, Seattle, and Leland B. Flint of Salt Lake City were given the story at a 10th anniversary convention. Then they held big dealer meetings to tell them the story and launch the campaign. A new standard model ironer was also announced.

Second million

Electric blankets and comforters will be featured by many promotional campaigns in the West this fall and winter. Among them will be those of Inland Empire Electrical Dealers Assn., San Diego Bureau of Radio and Electrical Appliances, Idaho Power Co.,--as well as all the makers of blankets and comforters.

No bundling needed

Another blanket maker will be Fieldcrest Mills, the Marshall Fields' manufacturer. It will market one at about $45.

New

Universal's vice-president, E. J. Van Buskirk and A. S. Bross, S. G. Fisher and E. A. Powers are touring the country holding pep meetings in 16 cities, among them Seattle, San Francisco and Los Angeles, to set a big blanket promotion in motion.

Slumber merchants

With a new price of $12.50 the General Mills Tru-Heat iron will provide a better margin for dealers. With it a new model is introduced, which has a steel encased heating element and some switch and handle changes.

More margin

Bon Marche opens a big new department store in Spokane Sept. 5. First it was to be a C. C. Anderson store, now its to be a second Bon Marche, for all are part of the Allied Stores group. Appliance department manager in Spokane will be Gail Adams.

Big store

Lamp globes will be campaigned in Idaho and certified lamps in northern California during September. Idaho Power and Boise lamp distributors are behind the globe promotion with advertising helps, contests and the like for the whole month of September. Northern California Electric Bureau has a strong campaign to promote the new certified floor and table lamps from Sept. 8 to 13, with 600 dealers participating.

Light campaigns

A new certification program for home lighting fixtures is being announced also by the American Home Lighting Institute. Fixtures so certified will incorporate IES lighting performance recommendations and be tested by the Electrical Testing Laboratories. Fixtures will have certification tags to identify them.

Home fixtures

Still on lighting—Westinghouse announces Ciclarc lamps, half circle 18-watt fluorescent lamps, which permit more convenient use in some cases than the circline lamp since both semicircles are removable.

Half round

Electromaster suggests $179.50 as selling price for its Spacesaver electric range, equipped with lamp, oven control clock, deep well cooker and three burners as well as large oven; also that two in tandem make a superdeluxe combination of two ovens and eight burners at single range cost.

Compact package

Dealer meetings follow the series of three Westinghouse distributor gatherings in Los Angeles, San Francisco and Seattle at which E. W. Isenhower, western radio manager, W. H. McKnew, service manager, L. S. McLeod, sales education and J. H. Stickle, advertising, showed the new models. There are 19 cabinet variations on the 12 model line, selling from $37 to $600 and featuring FM with some new circuits.

Radio line

FM is still having a time of it. A recent conference of interested executives met with Petrillo to try to get some sense out of the boycott that is holding back FM development. Petrillo admitted the limitations of the Lee Act and the Taft-Hartley Act but said, "If you need musicians, we have the musicians." His monopoly still dicates.

Holds the reins

Managers of electrical leagues have a significant agenda for their annual conference at Statler Hotel, St. Louis, Mo., Oct. 8-11. Besides a valuable "bull session" on ways to or not to run a successful association, they'll hear well qualified opinion on legal, sales, lighting, wiring, farm electrification, kitchen and laundry planning and personnel activities of such promotional organizations throughout the country.

Leagues meeting

J. N. Ceazan Co., moving into bigger quarters in the Western Merchandise Mart, also became exclusive distributor for Farnsworth television and radio products, and Marion electric ranges and water heaters. Before year's end the company will move its San Francisco warehouse and offices to a new building at 9th and Harrison, says H. D. Scibird, its manager.

New lines

Sperti Inc. has just bought Faraday Electric Corp., maker of signals and bells and since the war, the Broilmaster. The move means expansion into a line of appliances bearing the Sperti-Faraday name.

Sunbroil

Monitor, represented at the Mart by Leroy H. Bennett Co., just moved into its space before Market Week, but now is really fixing it up. Easy Washing Machine space too was not finished; will have a new louverall ceiling lighting job.

Finish moving

Not exactly new, for it was made for army use in the war, but in a new model for a multifude of civilian uses will be the Magnograph steel tape recorder, made by Herman S. Heller, former music director and inventor who worked on first movie sound recording. Magnograph Corp. of Hollywood puts as many as 20 channels of sound on a steel tape, operates it slower speed to get higher fidelity, makes a more rugged record than wire.

Tape recorder

First price increase since January was announced by Presteline on its electric ranges. New prices are national, instead of the former four-zone prices. Deluxe model with any of the three tops is priced at $284.95.

Price rise

When dynamic Charlie Wilson, president of General Electric Co. came to set Ray Turnbull up in business as the new West Coast regional vice-president, he was hit with many questions at a press conference. In brief these are the answers he gave:

On the spot

The key to all price increases, Wilson thinks, are food prices and housing prices. When they go up it echoes as a demand from unions to increase wages again, and then everything ups a notch.

Food key

There will be no appliance shortages in a few months. G-E's refrigerator plants have never operated above 58% of capacity because of steel shortage. Steel may still be short way into '48 or '49. Washing machine plants have been closed down a quarter of the time in the last two years for the same reason.

Geared for high

Prices, said Wilson, can only be lowered on G-E products by improved technology and better mass production.

How

Appliance manufacture in the West? Yes, when the market and exports warrant mass production. Water heaters, irons are already made out West. Ranges, washers and then refrigerators may come later.

Made in West

A Washing Machine Parts manual that combines both a catalog and a guide to some 44 lines, motor direction chart, component parts assemblies, wood bearing list, etc., containing 10,000 actual photos, has just been brought out by the Appliance Parts Jobbers Association, of 1015 Dime Bldg., Detroit, 26, with the cooperation of the Washing Machine Manufacturers Assn. at a cost of $75,000.

Super catalog

Carlos Stone has been appointed manager of the Intermountain Electrical Assn., Salt Lake City, succeeding Arthur J. Reynolds, who joined Westinghouse Electric Supply Co. last month. Stone has been in the construction business on his own and was director of sales for Provo city light plant.

New manager

Federal Trade Commission, anxious to make a name, is giving a cold eye to the Fair Trade laws. They are watching the trend of prices to see if Fair Trade keeps them up when they might go down under competition.

Eagle eye

In its second cost ratio study, for the first quarter of 1947, the Inland Empire Electrical Dealers Assn. indicates that reporting dealers showed a consistent 10% net as an average, with cost of goods showing a slight decrease, selling expenses rising and operating expenses slightly up. Compensation of salesmen is on the increase. — Cost ratios

All details are now worked out for the resumption of San Diego's big electrical exposition as J. Clark Chamberlain has covered them in a special bulletin to members and manufacturers and distributors. It will be held Dec. 2-7, in the former Federal Building in the 1935 Exposition. With standard decorations and signs, one exhibit of any one product will be accomodated and thus permit a maximum number of products to be shown. The very successful formula of previous shows will be followed. — Big show returns

"Let's Get Personal" is a new sound slide film prepared by the Radio Manufacturers Assn. for sales training in preparation for National Radio Week and thereafter. It runs 12 minutes, tells in kodachrome pictures why every member of the family needs an individual radio. Prints may be bought or even borrowed from Fred Eldean Organization, 670 Fifth Ave. New York. — For each his own

People keep moving. F. T. "Ted" Brien, merchandise manager of Graybar, Seattle, took a new job as executive vice-president of Radio Television & Appliance, Inc., and Norman A. Hayes was moved from Portland to take his place at Graybar, Seattle, as merchandise head for Northwestern district. R. H. Moore, former City Light salesman has become kitchen specialist for Graybar. In San Francisco Easy Washer Co. has appointed Bernard Morris as district manager, under F. S. Fenton Jr., division manager. He was formerly appliance manager for Levy's Department stores, San Mateo. — People move

Bank of America has just issued a straight-from-the-shoulder little pamphlet of financial advice on the Home Appliance Business for the guidance of those already in and those thinking about entering the game. Gives much the same type of advice our Sales Guides have been treating. — Bank advice

Proctor's novel introduction of its new automatic toaster, complete with singing telegram, hand delivered orchid and finally toaster, drew lots of ribbing from the newspapers. Good publicity, all of it. Meanwhile Proctor has decided to curb imitators by patenting even the design contours of its appliances. Imitators copy the looks but not the construction and quality, says Proctor, and thus cheat the public. — Orchid deal

Horton, which has made many private brand ironers for others, has decided to feature its own brand name and launch a campaign for the business. — On own

Electric heat is generating a lot of dealer and manufacturer heat in Seattle because the city's Department of Lighting has just had passed a new ordinance raising the electric heating rate from the previous low of 9 mills to 1.8 mills for all energy over 1,200 kwh. per month. An electric heating association has taken the question to the city council, threatens a referendum to remove the new rate and an initiative to reduce all rates. The issue was still being argued hotly at press time. — Hot in Seattle

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ELECTRICAL WEST
Sales Guide

FOR THE ELECTRICAL MERCHANT OF THE WEST © September, 1947

How Shall I Pay My Salesmen?

An analysis of the various methods

by R. L. Wilkinson
Executive Secretary
Inland Empire Electrical Dealer's Assn.

One unproductive or dissatisfied salesman in a retail store employing two salesmen can create a situation fully as disruptive as a strike of half the labor force of an industrial concern employing thousands. A compensation plan which is inadequate because it does not recognize merit or because remuneration is insufficient or because rates for one group of employees are out of proportion to those for another group can cause far-reaching personnel difficulties.

In the merchandising field, salesmen furnish the productive labor. Qualifications required are varied and exacting. Since normal numbers of salesmen were not selected and trained during the war, the skilled members of the profession are in considerable demand.

Therefore, although the relatively low profit margins of electrical dealers limit the range of allowable selling expense, compensation must be fairly liberal to attract capable and stable individuals to an appliance selling career. This condition, coupled with the fact that in announcing a wage plan to his employees and applicants an employer is making irrevocable commitments, makes careful planning mandatory.

What Are the Different Ways?

There are only three basic ways of compensating salesmen—

1. **Fixed income** (straight salary),
2. **Income in direct ratio to sales** (straight commission),
3. **Combination of fixed income and incentives.**

There are a number of variations of the combination type of plan, however. Common ones are:

Commission with draw. In this plan, commissions based on a percentage of sales are paid, but the salesman is allowed to draw a specified amount (to provide at least the necessities of life) regardless of the amount of commission. If the draw exceeds the commission at any time, the resultant deficit is later cleared by application of earnings in excess of draw.

Commission with guarantee. This plan also provides for commissions in direct ratio to sales and a guaranteed income to provide basic necessities. However, the guarantee is paid outright if commissions fall short of the specified amount at any time. The amount by which guarantee exceeds commissions does not have to be paid back by the salesman.

Salary and Commission. This plan provides a salary sufficient for basic needs and a commission, usually paid only on sales above a specified sales quota. The salary can, of course, be raised to compensate capable, experienced salesmen for work which builds good will and secures new customers, thus giving them increases in earnings not dependent upon actual completed sales. Additionally re-

fined, commissions sometimes are based on an ascending scale to provide increased incentive or are figured in dollars instead of percentages, thus giving greater incentive to sell slow-moving or higher-priced items.

Bonuses. Bonuses can be added to any of the basic plans or variations as additional incentives to sell slow-moving merchandise, to achieve difficult quotas or to maintain steady effort.

Profit Sharing Plans. They are not discussed here, because they generally are of broader application and not limited to sales personnel.

Which Way Is Best?

A compensation plan which works successfully in one store cannot be expected to produce equal results in another. The decision as to what type of incentives, if any, will be employed must be based on individual conditions in your business. Perhaps of even more importance than the type of plan is the method in which it is administered. Advantages and disadvantages of various plans should be weighed in light of your needs and of your facilities and inclination to administer them.

What Should You Consider?

The accompanying table compares common plans and variations.

The design of your compensation plan will be affected by several considerations. You should decide:

1. Whether the future selling job will largely rest on the salesmen or whether much reliance will be placed on advertising and good location to make the salesmen's work easier;
2. Whether you will hire experienced salesmen or whether you will train your personnel yourself;
3. The number of salesmen needed to create maximum efficiency in the type and size of operation you plan;
4. The amount you can afford to pay for a sales force;
5. Whether the amount you can afford, when divided among the salesmen needed, will give each an income which is—
   a. satisfactory to him;
   b. comparable to incomes of others in the community doing similar work;
   c. in fair proportion to your personal salary and the incomes of your other employees;
6. Which plan's advantages outweigh the disadvantages for your business.

How Much Should You Pay?

The amount to be paid each salesman will, of course, be based on considerations No. 3 and 4 above, substantiated or modified by consideration No. 5. The amount you can afford for a sales staff is a budget consideration. An expenditure of 3.9% of net sales was the average for "high profit" dealers in 1946 according to the IEEDA Cost Ratio Study. This figure is undoubtedly too low because sales effort required in 1946 was not representative of future conditions. Preliminary results of the IEEDA First Quarter 1947 Study show an average of 7%. On the basis of one study in 1940 an allowance of 7% was suggested as suitable for the average operation at all time. Of course no such arbitrary figure can be considered satisfactory for all stores or for all circumstances.

If you have selected one of the plans which provides incentives, determination of amounts of incentive should follow determination of total amount to be budgeted for the compensation of each salesman.

Regardless of the nature of the plan selected, probable costs of any employee benefits provided

Which Plan?

Factor	Amount of incentive for increased effort	Incentive for building long range business	Risks from business slumps or decreased selling efficiency	Salesman's attitude and security
Straight Salary	No tangible incentive	Slight incentive if merit reflected in raises	All risks taken by employer	Promotes feeling of security
Straight Commission	Greatest incentive since earnings directly proportionate to sales	Current sales all-important, even if at expense of stable business	Full risks taken by salesmen. Owner's risk reduced	May cause uncertainty and fear
Commission with draw	Considerable incentive but may be less than straight commission	Same as straight commission	Theoretically same as straight commission. However, excessive deficit may cause salesmen to quit, leaving full risk to owner	Better than straight commission, if draw high enough for necessities
Commission with guarantee	Same as commission with draw	Same as straight Commission	Risks shared	Same as commission with draw
Salary and Commission	Same as commission with draw	May foster more stable and farsighted outlook	Risks shared	Permits feeling of security

e.g. insurance and paid vacations) should be accounted for, because these costs must be paid out of the total allocated to salesmen's compensation.

If the straight salary plan has been chosen, the remainder, after a reserve for benefits has been deducted, can be scheduled for salary payments.

If the straight commission plan is to be used, the amount to be set aside for benefits can be expressed as a percentage of anticipated sales and deducted from the percentage of sales budgeted for salesmen's compensation. The remainer will then represent the amount of commission to be paid.

Example: You have two salesmen and you have budgeted 5% of an anticipated sales volume of $96,000 for their compensation. You provide two weeks' vacation and sick leaves with pay based on average earnings during the preceding two months. If you estimate a cost of $92 each for vacations and $70 for sick leave your total cost of benefits will equal $324 per year, or about .35% of gross sales. Commissions could be set at 5% of selling prices and .15% of gross sales would be left for special bonuses.

If commissions with guarantees are planned, some reserve probably should be provided to permit payment of the guaranteed income without exceeding the budget allowance. Since, in theory, amounts drawn in excess of commissions under the drawing account plan will be deducted from future commissions, the reserve provided for this plan need only be large enough to cover losses which might be incurred if salesmen terminate their employment owing money against future commissions.

The amount of fixed income under either of these plans will be determined by the cost of bare necessities in your community. In a good commission-plus-guarantee-or-draw plan, the amount guaranteed should be low enough that it will exceed earned commission only in exceptionally bad months. Therefore, since payment in excess of earned commissions will seldom be made, percentage commissions can be nearly as high as those permitted by the straight commission without running the risk of exceeding total budgetary allowances.

The combination salary and commission plan has features which complicate the establishment of amounts. Commissions are paid on sales above a minimum quota rather than on all sales.

It is necessary, then, to determine three things in order: (1) amount of salary, (2) minimum sales volume on which commissions will be paid and (3) percentage commission.

To determine the last, deduct the amount of fixed salary from the amount budgeted for salesmen's compensation, and deduct the minimum sales quota from anticipated sales. The ratio of the amount left for commission to anticipated sales above the quota will be the percentage commission to be paid.

Example: In the example used to explain the computation of straight commission, 5% of gross sales remained for compensation after costs of employee benefits were deducted. This would provide each salesman with an income of $2,400 a year if anticipated sales were realized. If, under the combination plan, each salesman were guaranteed a monthly salary of $100, $2,400 a year would be left for commissions for the two salesmen on the volume anticipated. If you set their quota at $2,500 a month each, total quotas will equal $60,000 a year ($2,500x 2x12) and commissions will be paid on $36,000, the amount of anticipated volume in excess of quotas. Thus $2,400, the amount set aside for commissions, divided by $36,000 equals 7% which is the commission to be paid on sales above quota.

The amount of salary to be paid and the quota to be set depend on local conditions. An arrangement which provides for commissions about equal to salary is sometimes recommended. Salaries should start low enough so they can be advanced in recognition of merit and service. To make the advantages of the combination plan possible, however, salaries must be high enough to provide basic security.

Establishment of a quota is perhaps the most important step in designing a combination plan. If it is set at such a figure that the salary actually represents the amount of commission payable on the quota volume, the plan becomes little more than a

A Comparative Analysis of Features of Five Compensation Plans

Control and supervision of salesmen	Employee turnover	Cost to employer	Earnings of salesmen	Ease of administration
Full control possible	Not affected	High in low periods, lower in good periods. Not proportionate to sales	Nearly equal for good average or poor producers	Easier to administer
Severely limited by independent attitude engendered	May be increased. Encourages floaters	Always same percentagewise	High for good salesmen, may be too low to keep learners interested	Fairly easy. Requires extra bookkeeping. Easily budgeted.
Same as straight commission	Same as straight commission. Also, salesmen may quit rather than pay back draw above commission	Theoretically same as straight commission. Cost may increase some in slow periods.	Same as commission	More difficult. May be misunderstood by employees
About same as straight commission. May reduce independent attitude	Similar to straight commission	Higher proportionately in slow periods. Fairly regular	Same as commission	Same as commission
Full control possible because of salary	Probably not affected	Between salary and commission. Less range percentagewise than salary plan	Higher for good than for fair salesmen but range more limited than with commission plan	Danger of being complex and hard to understand. May complicate budgeting

commission-with-guarantee plan. If the quota is set higher, commissions for sales above quota will be larger, thus increasing incentive by making the "over-quota" goal harder to reach but more remunerative. If the quota is lower, incentive is less but commission earnings within easier reach.

It is often considered wise to set aside some of the money allotted to salesmen's compensation to offer as special bonuses for sales drives, slow-moving merchandise and the like or as prizes for "best record," "most improvement," "best use of training," etc. Any such special allowances should be deducted before amount of compensation is computed, of course.

Percentage commissions sometimes are translated into "dollar-per-item" commissions to make them clearer and to encourage step-up selling. If the salesman is always led to think in terms of $10 extra this month if I sell model B, $15 if I sell model A," rather than in terms of percentages, incentive probably will be greater.

Furthermore, incentive to sell the more expensive model can be enhanced by increasing the commission on it, deducting the difference from the lower-priced model. If the number of sales of the higher-priced model usually is only about half of the number of sales of the lower-priced, it may be worthwhile to add double the amount deducted from the commission for the cheaper to the commission for the more expensive. Thus the additional incentive in the case mentioned could be $8 more for selling "model A."

Be Financially Successful—by being Timely

Beginning a new series by

Ken Hampton

Success in business is more often achieved through observation of a few simple rules than through any uncanny shrewdness or cunning.

One of these rules is to be in tune with the times. A retail merchant must change with changing times. His purpose is to serve his customers with the things they need when they need them.

The war years were years of scarcity when there were not enough appliances to go around to the customers who wanted them. Naturally the successful merchant reduced his sales expense radically through these years. It was not necessary nor advisable to spend money for specialty selling or to spend substantial sums on advertising in order to make as big a net profit as possible.

We are now approaching **normal times** again. Normal times for the electrical industry are competitive times. Times when customers must be attracted into the store rather than a competitor's store and sold specific styles of appliances.

This means that the manager of a retail electrical store or department is much more concerned now about selling than he has been for some years.

This means that **all selling expenses will increase.** For some time now they have been low and probably reached an all-time low early this year. In fact, in many cases, the large profits that have been obtained by some operations have come from money that would have gone to promote sales and pay salesmen's salaries and commissions in normal competitive times.

Expenses that should increase are:

1. Advertising.
2. Sales promotion and display and store identification.
3. Sales salaries.

As a start toward determining how much money you should spend on a new business expenses, do two things:

1. Go back to the last truly prewar year you operated in, say 1940, and determine the total amount you spent for advertising and sales promotion. Also determine the per cent paid for sales salaries to sales.

2. Figure what the totals of these expenses would be if for the first half of this year you had spent at the 1940 rate on your present sales accomplishment. Make the resulting figures your budget for each of these items for the last part of 1947. If you are new in business, set aside 3% of your volume for advertising and sales promotion and from 8% to 10% for salesmen's salaries and commissions.

A study published in **Electrical Merchandising** of September 1940 showed selling costs in 1939 averaged 14%,* whereas recent studies indicate selling costs including advertising and sales promotion are averaging less than 5%.

Many businesses will find that if they had spent 12% to 13% for selling expenses during the first six months, their profits would not have been satisfactory. This is a strong indication that either expenses are too high or volume is too low.

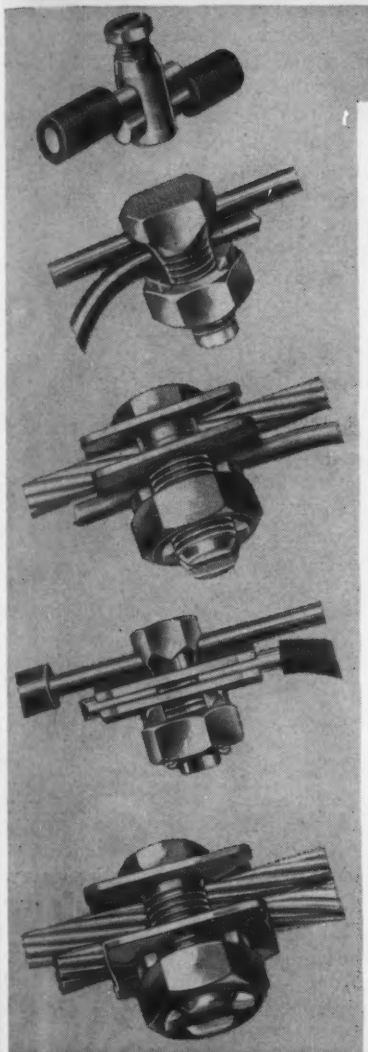
Analyze first to find expenses that may be cut. Check your expenses—all of them. If some of the items are top-heavy, correct this condition. If some are out of line with what they should be for stores of your size, your type of business, and your community, get them back into line.

Check your waste—you'll probably find many ways in which your profits are dribbling away. Sure, it's only a little here and there. But it counts up. Plug up these "ratholes" and keep them plugged. Stealing, damage to merchandise or fixtures by customers or employees, yes, even such trifling things as waste of string, paper and other supplies all have their cumulative effect. Also, correct any condition that might create a fire hazard. In other words, fight waste and **potential** loss wherever you find them.

After you have reduced your expenses, if you are still not satisfied, go talk with your principal suppliers on ways and means of increasing your volume. The very act of increasing sales expense wisely will help if you place the effort on the proper items of merchandise.

"MILLIONS IN USE THROUGHOUT THE WORLD"

BLACKBURN *Hi-Strength* CONNECTORS



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Cutting maintenance costs with **A**merica's **B**est **C**onnector in these days of rising labor costs is as simple as A-B-C with BLACKBURN Hi-Strength Connectors—**best** on four counts:

- BEST because they're trouble-free on the line
- BEST because they produce a more efficient connection
- BEST because they last longer—are non-corrosive
- BEST because they can be used over and over again

BLACKBURN **Hi-Strength** Connectors are strong, durable and lasting. In fact, they're the most durable connectors you can buy! That's because they're made of DURONZE—which is stronger than commercial bronze and 75% stronger than hard copper. Once installed, BLACKBURN Connectors are there to stay . . . indefinitely.

All Eleven Offices and Warehouses of the
GENERAL ELECTRIC SUPPLY CORPORATION
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BLACKBURN CONNECTORS

DISTRIBUTORS ON THE PACIFIC COAST

GENERAL ELECTRIC SUPPLY CORPORATION

SAN FRANCISCO • OAKLAND • SACRAMENTO • FRESNO • LOS ANGELES
SAN DIEGO • PHOENIX • SEATTLE • PORTLAND • TACOMA • SPOKANE

Television Horizon is Widened by New Test

Technicians in San Diego find reception from Los Angeles stations to be satisfactory. Event has significance for every region planning video

Now that the power of television transmission in Los Angeles has been greatly increased, television reception in San Diego (120 miles distant), is entirely satisfactory on an experimental basis, Ivan Lauritzen, chairman of the Electronics Division of the Bureau of Radio & Electrical Appliances of San Diego County and manager of the radio division of Coast Electric Co., told the nearly 50 radio technicians and service repairmen assembled for the bureau's recent Electronics Division meeting.

In a brief and concise summary, Lauritzen revealed the results of exhaustive experiments conducted by San Diego radio technicians during ten weeks to determine whether television reception from Los Angeles is commercially practical and to determine what quality of program and reception will be acceptable to the public.

The San Diego experiments, he said, were conducted with a variety of receivers: one RCA 5-in.; one General Electric 12-in.; one Army radar receiver rebuilt for television; one 20-in. Dumont; and four 7-in. kits designed for home assembly.

The experiment showed that the Point Loma and Mission Hills, Mt. Helix and La Jolla areas produced pictures with clear definition of detail, variation of contrast, and without any interference. In the El Cajon Blvd. and Loma Portal areas a stable picture was obtained with good contrast, but was occasionally marred by noise or other interference. In the Kensington Heights and National City areas, the experimenters were able to receive a picture with good contrast but occasional momentary loss of synchronization and more frequent indications of noise or r.f. interference. In the University Heights, North Park, Chula Vista and downtown areas, the experimenters were able to receive the test pattern, but more than half the time the picture was lost due to loss of synchronization or strong interference. The experiments Lauritzen stated, covered sufficient time to allow definite conclusions and were not arrived at after just one day or one night at any location.

Among the most important factors to good reception are the elevation at which the experiment is conducted, and, more exactly, the elevation of the antenna above sea level rather than its elevation above the ground; and proper installation of a good antenna.

"In general, therefore, we cannot say that television reception from Los Angeles is good enough to consistently get interference-free reception in any but the highest elevations, or where the conditions are affected by proximity to the water front or by a very elaborate antenna installation and a receiver with an r.f. amplifier stage," Lauritzen stated.

"It is the unanimous opinion of all those who have conducted the San Diego experiments that no two locations will give the exact same results, and that to handle television as a commercial enterprise, great care in the selection of locations for consistent results is mandatory. It is agreed that there are plenty of locations in San Diego where Los Angeles television can be received to the satisfaction of customers, but one cannot determine those locations other than by making actual tests in each case where you intend to sell that receiver.

"It is probably impractical for every dealer to equip himself to make those tests, and it is recommended that those of you who will specialize in television installations and service be prepared to make those tests and installations, for a fee, of course, for dealers not so equipped. By equipment I mean the physical materials and technical knowledge required actually to make the field strength measurements and installations and the personnel and liability insurance necessary to protect all parties concerned.

"Public interest in television will surprise you. The mere fact that action from a remote source can be viewed in one's living room is more exciting and more wonderful to our neighbors than was the advent of the crystal sets and the first loud speakers twenty-five years ago. Our experience has been that the public does not demand or even expect perfection in television. In the course of our experiments any one of us could have had an intensely interested viewing audience of a dozen people any night regardless of reception conditions, and if we had been interested in sales, plenty of business could have been written on the spot."

In referring to the use of television kits in conducting the experiments, Lauritzen had this to say:

"The availability of kits has served two purposes, that of providing a practical means for the experimenter to investigate the television field and to provide a low-cost television receiver for the not-too-fussy customer. But another outgrowth of television kits is to provide the radio serviceman with means to learn the techniques of television receivers in a practical manner.

"There is nothing about television that the competent radio technician cannot assimilate, and those of you who want to qualify yourself to service television receivers will be the natural heirs to a new field of electronic service that should be every bit as lucrative as the sound business, for example. Provision has already been made to include television service study in the advanced classes of your vocational school.

"We just want to make it clear that television is here for those who have a reasonable suitable location, will permit a proper installation, and will not demand perfect reception every night in the week."

Show Dates Set

San Diego will have its electrical show this fall. For six years this show has been abandoned because of war conditions. Last year a building in Balboa Park sufficient in size for such a show was not available as the Navy had not yet vacated the park buildings. But it will be held Dec. 2-7 as the Tenth Annual Electrical and Home Appliance Show.

Space to hold it in again became a problem when the city building inspector condemned the old fair buildings which had stood since the 1915 Exposition and had been revamped from time to time. Therefore the appliance show will have to be held in the federal building in the Palisades area of the park, a more recently constructed building.

The show will be open to manufacturers and distributors only in order to permit a single showing for each product and thus provide an exhibit opportunity for all manufacturers. Space is limited and will not permit both dealer and manufacturer distributor showings. The Bureau of Radio & Electrical Appliances of San Diego County will sponsor the show as it has the previous ones. J. Clark Chamberlin, secretary-manager, will direct it. Uniform exhibit spaces completely decorated and ready to move in will be provided the exhibitors.

Electromaster

★ SETS THE PACE AGAIN! ★

OFFERING DE LUXE FEATURES—for the FIRST TIME in an electric range designed for the small kitchen

Automatic Oven-Timer Clock—What a sales feature this is! Now you can sell big range cooking capacity—plus automatic oven cooking control in the famous Space Saver. *It's exclusively Electromaster!*

Soft-Glo Lamp—And the Soft-Glo Lamp that gives full range-top illumination. High in utility value, its attractive design adds a modern touch of beauty to the small kitchen. *It's exclusively Electromaster!*

Vita-Miser Deep Well Cooker—The Deep Well Cooker has been standard equipment on the Space Saver but has never been offered on any other electric range of this type. *It's exclusively Electromaster!*

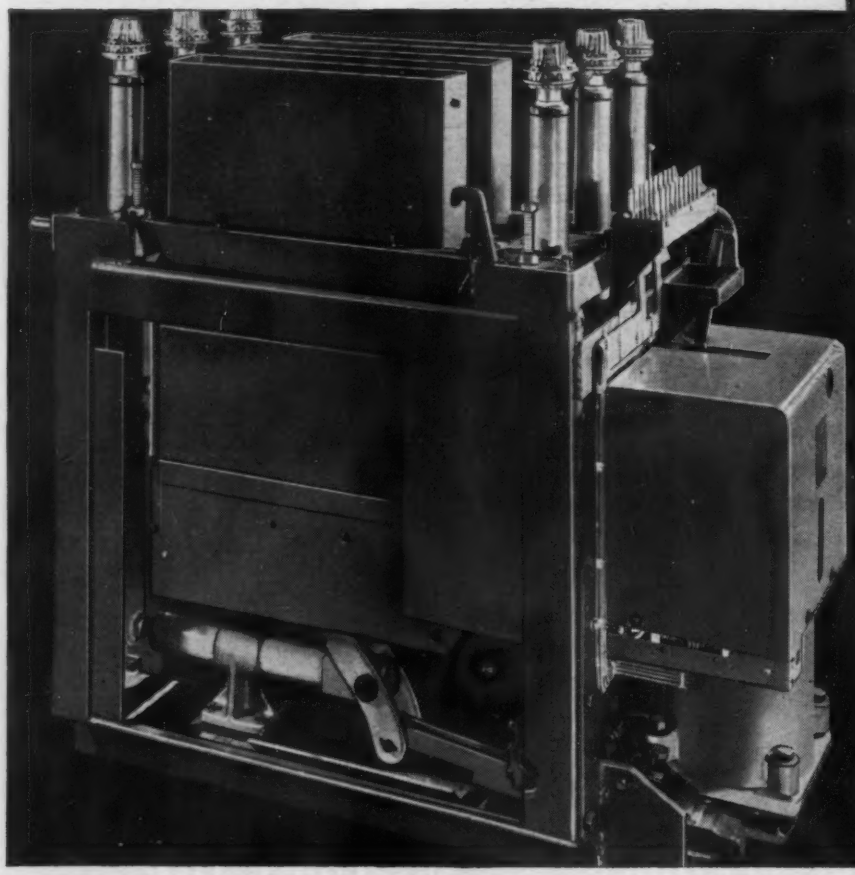
Plus Electromaster Quality Craftsmanship—Sell Electromaster electric ranges and you sell the finest in design and modern cooking features. Electromaster ranges sell faster because they are built by *electric range specialists.*

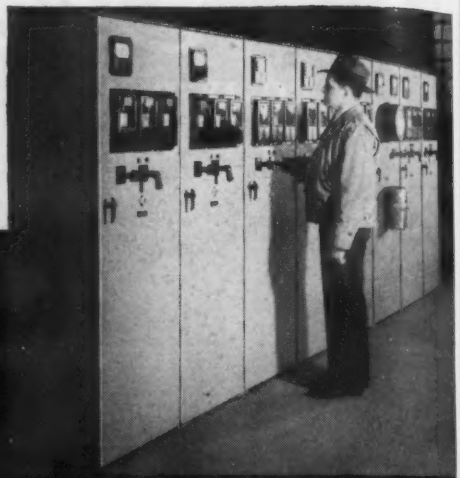
THE FINEST NAME IN ELECTRIC COOKING SINCE 1929

Electromaster Inc.
MOUNT CLEMENS, MICHIGAN

The Electric Range "That's Fit For A Queen" On The "Queen For A Day" Program—Mutual Network

Contacts Last Longer in Oilless Ruptair* Breakers!





Bank of RUPTAIR breakers in vertical lift metal-clad switchgear installed in midwest manufacturing plant.

These Modern Breakers Take Less Maintenance ...Need Less Space

RUPTAIR magnetic air circuit breakers are the only vertical-lift breakers having horizontal contact separation *plus* all of the added advantages of vertical-lift metal-clad switchgear design: saving of cubical space and aisle space.

They are oilless, self-contained interrupting devices, in ratings up to 5 kv and 250,000 kva interrupting capacity.

Primary disconnect fingers are installed on breaker elements, easily accessible for inspection. *A combination of silver-to-silver main contacts and Elkonite arcing contacts assure longer contact life.* RUPTAIR breakers are equipped with solenoid operators with provision for maintenance-operation, test and inspection.

★ ★ ★

Modern metal-clad switchgear was introduced to the U. S. by Allis-Chalmers. The next time you need dependable metal-clad switchgear, call on Allis-Chalmers wide experience. For prompt assistance, see our nearest office. For Bulletin 18B6346, write: ALLIS-CHALMERS, MILWAUKEE 1, WIS.

*Allis-Chalmers Trademark

Allis-Chalmers Builds all four Types of Circuit Breakers

AIR BLAST breakers are available in interrupting capacities from 250,000 kva to 500,000 kva.

Magnetic Air... Allis-Chalmers trademark, RUPTAIR. Capacities: 50,000 kva to 250,000 kva.

Oil . . . Allis-Chalmers trademark, RUPTOR. Interrupting capacities from 50,000 to 500,000 kva.

Low Voltage . . . metal-enclosed dead-front; capacities from 25,000 to 50,000 A.I.C., 600 volts, a-c max. A 2286

ALLIS-CHALMERS

One of the Big 3 in Electric Power Equipment — Biggest of All in Range of Industrial Products

1847 1947 A CENTURY OF SERVICE to Industry THAT MADE America Great

THE RUHR—
VALLEY OF DECISION

FOR AMERICANS and for American business the most important single spot on earth today is the Ruhr Valley of Germany—a valley no bigger in area than the State of Rhode Island. Upon recovery in the Ruhr hinges recovery in Europe. Upon recovery in Europe hinges the peace of the world.

No machine can run with its most important part missing. Western Europe without the Ruhr is a dead machine. Before the war, over half the coal and steel produced in the Western part of Continental Europe came from this one little valley. Today, the fact is that no other region in Europe has the technical skills and enterprise to produce the industrial supplies which Europe must have if it is to help itself back to a self-supporting economy. And, after observing Europe for many weeks, I am convinced that no one but the United States can successfully supervise the rebuilding of the Ruhr.

If you will keep four considerations in mind, as the international politicians gamble, you can easily tell whether the United States is playing its proper role in the rehabilitation of the Ruhr. Here are the four considerations:

I. We are paying for the Ruhr rehabilitation (or the lack of it).

II. We alone have the skill and enterprise to supervise its rebuilding.

III. It will be a tough organizing job requiring money, hard work, and outright sacrifice on the part of management men and technicians.

IV. We had better do it well if we love our children.

I

We are paying for rebuilding the Ruhr—or we soon shall be. The British now control the Ruhr, its government and its industry. They have been paying out about four hundred million dollars—American dollars—a year to buy the food, raw materials and equipment needed to rebuild the Ruhr. The British must spend American dollars for these supplies because the supplies can not be bought anywhere but in America. Thus far the British have, in effect, obtained the dollars which they spend for the Ruhr by drawing them out of the $3,750,000,000 loan which we granted Britain last year.

Now the loan is fast running out. The British lack dollars and other assets. We must take over, directly or indirectly, the dollar expenditures for rebuilding the Ruhr. We shall pay for it. Therefore—

II

We should supervise it. The British have been running the Ruhr's industry. They might conceivably suggest to Washington that they continue to run it while we pay the bill. *That we should never agree to.* There is a sound old rule that he who pays the piper shall call the tune.

Perhaps we would not need to invoke that rule if the British had done a good job reviving the industries of the Ruhr. *They have done a poor job—physically and ideologically.*

The physical output of the coal mines and steel mills of the Ruhr in recent months was actually smaller than at the first of the year. Production of coal amounts to little more than half of the pre-war 127 million tons per year. Steel productions limps along at one-sixth of the pre-war rate—far below the volume permitted even under the present low level-of-industry plan for Germany.

Ideologically, the British Labor Government has tried to export to Germany the brand of socialism which is making such a dubious record at home. Foreign Minister Bevin—although he may now have misgivings about it—committed himself to nationalization of the Ruhr's coal and steel industries. British representatives have pushed hard to get General Lucius Clay, our able military governor in Berlin, to agree to socialization of the Ruhr. So far, he has resisted this pressure, but our State and War Departments and we as individuals must back him up to the limit if he is to continue to combat this pressure successfully.

Even if the British government were not socialist, there would be good reason for questioning the ability of Britain to rehabilitate the industries of the Ruhr. In recent generations, the British management class has shown itself more

interested in cartels, restricting output, and allocating markets, than in full-steam, ingenious enterprising production.

Certainly the British must remain full partners in the *political* administration of Germany. No one suggests anything else. However, their recent production record demands turning the job of revitalizing the Ruhr industries over to the nation which is paying the bill and which leads the world in production.

If we have any faith in the business philosophy by which we have lived and prospered for 170 years, we should demonstrate that that philosophy still is dynamic by taking up the burden of the Ruhr.

III

It will be a tough job. It will require men and supplies and money from the United States. It can not possibly be done in less than five years. A list of some of the necessary steps shows how hard it will be.

A. Plans for socializing the Ruhr should be shelved quickly. The industries there should remain in trusteeship for five years. Then the Germans themselves should decide their ownership; let us hope that by that time we can demonstrate to them that private ownership and private initiative mean high production, good distribution and high wages.

B. The top supervising management jobs—both the top policy and the top technical jobs—required outstanding business ability. That is why American business men must be willing to go to Germany, sacrificing comfort and leisure, and even income, if necessary.

C. Germans should take over the management job at the operating level. The Germans are good technicians. They have a greater incentive than anyone else for getting the Ruhr back in working order. That incentive should be harnessed.

D. Special effort should earn special rewards. There is nothing wrong with the Ruhr (or the rest of Europe) that hard work will not cure. Before a man will work hard, he must feel that his work will advance him and his family. That simple motive, which powers our whole economy, must be revived in the Ruhr. To revive it requires enormous ingenuity and work... a new currency... a logical customs union... a sensible ration system... enough food, clothing, housing and consumer goods so that the worker can buy something with his currency and his ration points.

E. America will have to furnish a good share of these foodstuffs and supplies. Certain key items of equipment also will be needed. Only as we succeed in our job can this flow be diminished.

F. A sensible priorities system must channel Ruhr coal and steel into those uses which, in turn, will further increase output. Repair parts for railroad cars should stand high on the list. Housing, coal equipment and machine tool parts should come ahead of the automobiles and permanent steel bridges which at times have been accorded preference.

German technical management of industry in the Ruhr—point C above—need not mean *political* control of the Ruhr by some future sovereign German state. As the French know, the Ruhr, next to the atomic bomb, is the most dangerous weapon in the world. It is the arsenal without which no European power, even Russia, would dare start a war. There is no sense in turning that arsenal back to the *political* control of a nation which twice in 25 years used it for aggression. (And three times since 1870.) Surely we have enough resourcefulness to let the Germans who live in the Ruhr run the industries there without turning political control over to a central Prussian state.

This partial list shows how much hard work and statesmanship the United States must put into the Ruhr. But—

IV

We had better do it if we love our children. If we do not do this job—if we should pull out of Germany or fail there—we leave behind us a vacuum which neither Britain or France has the strength or ability to fill. Russia has the will and, if left unopposed, the power to fill that vacuum. Therefore, the day we fail or the day we pull out of Germany, the third world war takes a long step closer to us and certainly to our children. What greater incentive does any American need to work for than our success in this field?

If we succeed, the western zones of Germany in conjunction with Belgium and Holland can become self-supporting in three to five years. That way lies recovery for all Europe. That way lies peace for the world. That way lies vindication for the American business system in which we believe—the system of competitive private enterprise, with freedom for the individual and his initiative.

James H. McGraw, Jr.

President McGraw-Hill Publishing Company, Inc.

THIS IS THE 60TH OF A SERIES

How often you need TWO baking temperatures — your meat at 350°, and your pie or cream puffs at 450°! And how often, especially when entertaining, you need more oven space! Here, in this new Monarch Roaster Range, both these needs are beautifully filled because you have *TWO* ovens. And what a convenience the surface oven is—for vegetable dinners, baked beans, spareribs, soups—saving electricity, stooping. Both ovens are timer-clock controlled.

ONLY Monarch ELECTRIC DEALERS *can tell this* 2-OVEN STORY

Here's a familiar baking scene that happens daily in millions of homes: Mrs. Homemaker needs two different baking temperatures at the same time. She has meat roasting at 350° and wants to bake a pie requiring 450°. Obviously, she needs an extra oven!

Monarch's exclusive Roaster Range with two ovens provides the perfect answer. Two baking temperatures are always available — as well as plenty of oven space!

Throughout America, over spot radio and in leading woman's magazines, Monarch advertising is telling the powerful 2-oven story to the nation's homemakers.

MALLEABLE IRON RANGE CO.
3997 Lake St. Beaver Dam, Wis.

RANGES AND HEATERS
Monarch-Paramount
COAL WOOD ELECTRIC GAS and COMBINATION RANGES

Dealers Aid Bedfast

Electrical dealers of Denver contributed measurably to brightening the lives of bedfast patients at the Fort Logan Veterans Administration hospital. Scores who *could* read and otherwise entertain themselves now *may* do so with the aid of bedlamps collected through the promotional efforts of Rocky Mountain Electrical League's Denver Chapter.

Reminiscent of the "Tinker to Evers to Chance" double play routine: A. T. "Al" Sievers, Denver insurance man who is a USO director, was worried because lighting at the Fort Logan institution was so meager that vets who couldn't leave their beds were unable to read newspapers, magazines, or even letters from home without eyestrain and discomfort. He posed the problem to Ralph B. Hubbard, RMEL manager, who promptly referred it to J. T. "Ted" Holbrook, chairman of the league's Electrical Appliance division.

Holbrook and Hubbard spread the word and soon bedlamps began to trickle in. The request was made June 1. By June 27, fifty clamp-on, pin-up and fluorescent units overflowed cartons in the RMEL office. Public Service Co. of Colorado had supplied fluorescent tubes and incandescent bulbs where they were lacking. A committee consisting of Hubbard, Sievers, Holbrook and Ralph Hanson, Public Service company representative, presented the appliances to the public services officer at Fort Logan who, in turn, distributed them to the patients whose need was greatest. "You should have seen the patients' faces light up," Hubbard observed appropriately.

RMEL was continuing the project and expected to fill the entire "order" (100 bedlamps) in August. Members are also soliciting golf clubs and fishing gear for the disabled vets. Use of this equipment in wards and hospital grounds develops proficiency of arms and legs.

Four-Color Ads

Using four color advertisements, Utah Power & Light Co. has given the selling advertising it is doing to assist dealers an additional punch. And dealers have eagerly availed themselves of the opportunity to tie-in their own advertising with that of the utility.

The first ads were run in March for the all-electric kitchen-laundry in the *Deseret News*, the *Salt Lake Tribune* and the *Ogden Standard Examiner*. A second set were run in the same papers in late April and early May. Another ad was then run on water heaters in late May. Others will be run later.

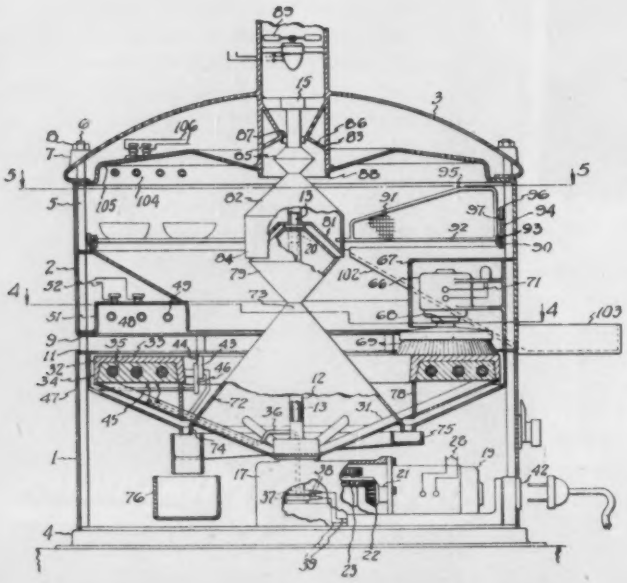
A bulletin was mailed to all dealers in Salt Lake City and Ogden, giving them the dates the ads were to run and urging them to see the newspapers themselves for tie-in advertising. The company did not promote such advertising itself, said M. S. Cummings, advertising manager, but the newspapers did contact dealers for such space. Results were fine on each occasion, the entire space around the center color ad being sold.

● COMPENSATION of salesmen is made the subject of a special bulletin of the Inland Empire Electrical Dealers Assn., dated Aug. 5. As a member service the association presents a summary of the different ways to compensate salesmen, and the points to consider in selecting a special method. An interesting breakdown of the several types of compensations as they affect incentive, risks, salesmens' attitudes, control and supervision, turnover, cost to employer, earnings of salesmen, and ease of administration concludes the reports.

The association is also inaugurating a stolen merchandise tracer service by which dealers report stolen merchandise by type, brand, model, and serial number, and all other members of the association are notified to look for such merchandise should it appear.

● ALTHOUGH IT NO LONGER MERCHANDISES, San Diego Gas & Electric Co. has trained and put into the field six electric range and water heater salesmen to secure live prospects for electrical dealers and carry through with the customers until the merchandise is sold. Their work will be largely devoted to the rural territory and they will also augment the company's other selling activities through the trade.

Device Designed to Eliminate Human Element



Positive time control which would assure uniform results in the broiling of meats has long been a dream of restaurant chefs. An automatic rotating electric broiler-griddle which will produce, "rare," "medium" or "well done" steaks or hamburgers with perfect regularity has been invented by Richard E. Staples of the Portland General Electric Co. sales department, to fulfill that dream.

The device provides absolute time and temperature control for surface cooked meats. Simultaneous top and bottom cooking gives a complete heat seal which retains the natural juices and flavor and reduces the cooking time. Predetermination of the cooking time which assures the desired degree of doneness removes the haphazard human control of watching and turning. This is accomplished by inserting the piece of meat to be cooked at the proper point on the periphery of the rotating broiler to assure the desired degree of cooking before the piece is automatically ejected. The machine is self-cleaning and self-ventilating.

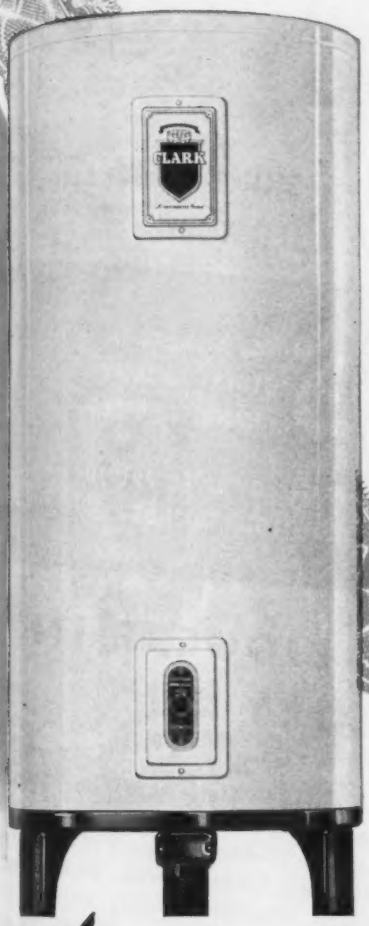
The broiler is designed in two sizes, one for hotels and restaurants and a second smaller size for sandwiches. The counter size will also simultaneously toast buns.

TEN YEAR GUARANTEE ON TANK *AND ELEMENT!*

A TOASTMASTER *Product*

CLARK

CLARK AGAIN MAKES
WATER HEATING HISTORY WITH
AN UNEQUALLED GUARANTEE OF PERFORMANCE



More than thirty years ago Clark pioneered the external "LIFE-BELT" heating element, now widely copied. A year ago Clark introduced the remarkable 'IONODIC' method of preventing tank corrosion. Now Clark again leads the field with a TEN YEAR GUARANTEE COVERING BOTH TANK AND HEATING ELEMENT — a warranty unequalled by that on any other heater in the field. Clark owners have learned, through experience, the remarkably long and trouble-free service it gives. Now future Clark owners will have bonded assurance that they too will receive equally dependable service.

Famous **CLARK** *"Firsts"*

★ **"LIFE-BELT"* HEATING ELEMENTS**

★ **"IONODIC"* TANK PROTECTION**

★*AND NOW— A TEN YEAR GUARANTEE ON TANK AND ELEMENT*

McGRAW ELECTRIC COMPANY
CLARK WATER HEATER DIVISION
5201 WEST 65th STREET
CHICAGO 38, ILLINOIS

Look to CLARK *for Leadership in Water Heating*

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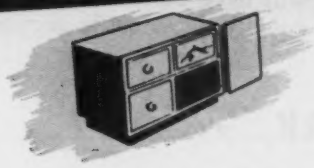
Front Page Stuff

FALL 1947

BIG DOINGS

WIN A GLAMOROUS ALL-EXPENSE WINTER VACATION TRIP

WIN A SHINY NEW 1947 AUTOMOBILE



WIN A WONDERFUL BIG RADIO-PHONOGRAPH SET

WIN GOLF CLUBS, A SHOTGUN, A WATCH, OR OTHER EQUALLY ATTRACTIVE MERCHANDISE PRIZES

WIN A PRIZE YOU'LL BE PROUD TO SHOW YOUR FRIENDS

BENDIX SALES CONTEST BIGGEST IN APPLIANCE HISTORY

On August 1st, Bendix started its mammoth million-dollar sales contest! Profits galore—and prizes by the score—for Bendix Home Appliance Dealers and their salesmen.

Imagine winning a glamorous all-expense winter vacation trip! Picture yourself at the wheel of a shiny new car! Or . . . win a wonderful big radio-phonograph set . . . a shotgun . . . golf clubs . . . a watch . . . or other equally attractive prizes!

There's super incentive for every Bendix salesman.

Tips for winners: Make sure your Bendix Washer prospect lists are accurate and up-to-date. Make sure your machines are prominently displayed in your store. Advertise your demonstrations—and schedule as many as you can. For Bendix merchants *know* how the Bendix Washer will sell itself if you give it a chance.

You will have the biggest advertising campaign in the history of the appliance business right back of you. Tie in with it by your local promotion efforts—and you'll go places in this history-making contest.

Your distributor will supply you with the contest rules.

BENDIX automatic Washer

on Home Appliances

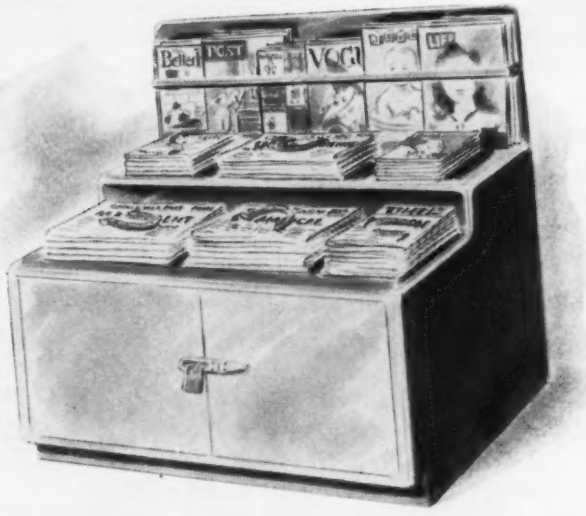
AT BENDIX

FAIR AND WARMER

BENDIX FALL ADVERTISING PROGRAM BIGGEST IN APPLIANCE HISTORY

Full page ads in color will appear in the big magazines that influence buying habits. The Bendix story will be powerfully told in: **LIFE, THE SATURDAY EVENING POST, LADIES' HOME JOURNAL, GOOD HOUSEKEEPING, McCALL'S, WOMAN'S HOME COMPANION, PARENTS' MAGAZINE, BETTER HOMES AND GARDENS, AMERICAN HOME, HOUSE BEAUTIFUL, HOUSE AND GARDEN, and TRUE STORY.**

Millions upon millions of sales-impressions will multiply the present Bendix prospects—and intensify the desire for the world's most wanted washer.



LOCAL NEWSPAPER ADS WILL FUNNEL BENDIX TRAFFIC TO YOUR STORE

Timely, hard-hitting newspaper ads are available through your distributor in sizes to fit your needs. These cover the selling story of the Bendix Appliances from every conceivable angle. Designed to slam home the basic Bendix story, yet they are tuned to the various selling situations that the Fall market may present. Whether your local conditions call for dramatic introductory ads, or ads stressing work-saving or economy, or ads with a strongly competitive cast—they're all ready for you.

And the Bendix Co-operative plan makes them available to you at low cost. Keep in touch with your distributor.

TREMENDOUS SALES POSSIBILITIES IN BENDIX DRYER AND IRONER

Two new work-savers: the Bendix Dryer and the Bendix Ironer—designed, engineered, and built to the same high efficiency standards as the Bendix Washer—*already* enjoy the approval of the American housewife. Preference surveys show that. To this appreciative audience the convenience of the Bendix Dryer, and the easy-operating simplicity of the Bendix Ironer will make them naturals for demonstration. They will give you new sales, new volume, and an enormous increase in profit dollars.

BENDIX HOME APPLIANCES, INC., SOUTH BEND 24, IND.

THE MONTH IN BRIEF

Utility Curtails Surplus Power

When Pacific Gas and Electric peaks hit unprecedented highs in August, three heavy chemical plants had their surplus power supplies curtailed by two-thirds. Shell Chemical, Dow Chemical and Hercules Powder for many years have bought surplus power (subject to shut-off after due notice) at rates considerably lower than regular industrial schedules. Duration of the reduction in supply will be governed by load conditions and rainfall.

Purchases Energy

In the meantime PG and E has been purchasing power from industrial, municipal and institutional customers having generating facilities. A low-water year, a hot summer which increased agricultural demand more than 20% and increased customer usage in every load classification combined to tax the system capacity.

USBR Reduces Shasta Output

USBR power development advocates used the California emergency as an excuse to reiterate previous charges of a power shortage and to build favorable public sentiment for larger appropriations for federal power facilities. Power output from Shasta Dam was reduced by 30,000 kw. so that construction might proceed at Keswick Dam lower down on the Sacramento River.

New Plant on Snake River Asked

Idaho Power Co. has applied to FPC for a license for a 100,000-kw. hydroelectric development near Bliss, Idaho, on the Snake River. This new plant would supplement the 85,000 kw. in new construction now under way. Cost is estimated at $17,000,000 and the first two units totaling 50,000 kw. would be completed by the summer of 1950.

Man-Made Rain Tried in West

Possibility of man-made rainfall to supplement natural supplies in the arid and semi-arid West was demonstrated recently in tests conducted by the *Arizona Republic* over the watershed back of Roosevelt Dam. Five hundred pounds of dry ice dropped into cumulus clouds resulted in 25 minutes of rainfall. The tests employed a technique developed by Vincent J. Schaefer, General Electric research scientist. Further experiments involved cooperation of both the Salt River Water Users' Assn. and the Central Arizona Light & Power Co. A company has been organized in Phoenix for commercial production of rain and snow using surplus Army bombers and a newly perfected machine for expelling dry ice.

Companies Sign for BPA Power

Five major Northwest power companies have signed contracts with the Bonneville Power Administration for delivery of 335,000 kw. during the coming year. The five companies are Pacific Power & Light Co. and Washington Water Power Co., 97,000 kw. jointly; Puget Sound Power & Light Co., 97,000 kw.; Portland General Electric Co., 130,000 kw.; Mountain States Power Co., 11,000 kw. Commitments are based on the amount of hydro which could be generated in event the Columbia's average flow decreased to its lowest recorded mark. Surplus above the contracted power may be made available to the companies, it is provided. Estimates on revenue to BPA range between $5,000,000 and $6,000,000.

Groups Oppose House Heating Rate

Repeal of a new electric house-heating rate (ELECTRICAL WEST, August, p. 104) and a 25% reduction in all Seattle City Light residential schedules will be asked at the March 1948 general city election by the Electrical Heating Assn. and the Electrical Contractors Assn. Petitions were being circulated last month by the two groups.

Pepco Reorganization Approved

Portland Electric Power Co.'s reorganization plan has been approved by bondholders and stockholders, according to a new tabulation of votes filed in federal court at Portland by Estes Snedecar, referee. An earlier tabulation was unfavorable to the plan but voting time was extended by Federal District Judge James Alger Fee, following charges of undue influence against the plan on the part of Guaranty Trust Co. of New York, holder of a large block of bonds. With acceptance of the reorganization plan, two long-time members of the PGE board of directors resigned. Franklin T. Griffith retired after 53 years with the company, and E. B. McNaughten, after 25 years.

Court Refuses Review

For the present at least, the court fight involving purchase of Puget Sound Power & Light Co. by Skagit County PUD is a dead issue. Late in August the Washington State Supreme Court refused to review its earlier decision denying the PUD the right to purchase the entire Puget Sound system at a $135,000,000 figure.

Supersonic Aircraft Lab

Government investigation of the Pacific Northwest as a site for a full-scale supersonic aircraft laboratory continues quietly. Features of such a research project would include a government-built community to house 15,000 persons, a $500,000,000-$2,000,000,000 expenditure and electrical equipment with a potential demand of 500,000 kw.

Expansion for Atomic Plant

An expansion program announced for the Hanford, Wash., atomic materials plant contemplates construction of new chemical process plants, research facilities, improvements to production units and community facilities. Although details were not made public, some observers expressed the belief that a town equal in population to Richland's 15,000 would be built and that the $350,000,000 plant would be doubled in size.

They just can't carry this load too long!

INADEQUATE WIRING, the industrial jinx, is too heavy a burden for any factory power lines. For, overtaxed, overextended, obsolete wiring can cut operating efficiency 25 to 50 percent.

And, sooner or later, this sinister acrobat causes tie-ups that result in costly shut-downs for extensive alterations.*

Call in your plant power engineer, consulting engineer, electrical contractor or utility power salesman. These are the men who can throw a net over him!

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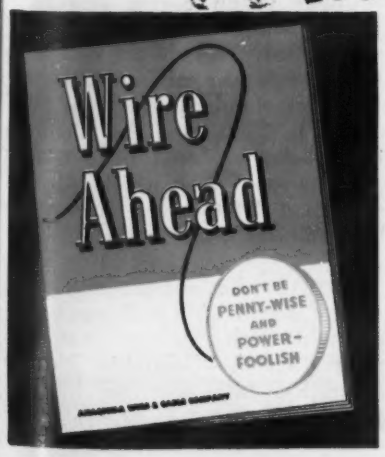

*WIRE AHEAD, a new booklet discussing preventive maintenance . . . the symptoms of inadequate wiring . . . and presenting plans for anticipating electrical demand, is now available on request. Address Advertising Department, 25 Broadway, New York 4, N.Y.

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BM SYSTEM

THIS MONTH'S NEWS

LOS ANGELES ALLOCATES FUNDS FOR DAM STUDIES

Following curtailment of USBR appropriations, the Los Angeles Board of Water and Power Commissioners allocated $60,000 for exploratory work on the Glen Canyon Dam site on the Colorado River. This action will save at least a year's time in preliminary engineering of the project, according to Charles P. Garman, chief electrical engineer for the Los Angeles system, who pointed out that the city will need large additional blocks of energy from the Colorado.

Studies have been in progress for some years on power sites in Bridge Canyon, 113 miles above Hoover Dam on the Colorado, and at Glen Canyon, another 250 miles up the Colorado. The Bridge Dam site has been determined by drilling, but a site tentatively selected at Glen was found unsatisfactory, necessitating further exploratory work.

The combined Bridge and Glen projects when completed will produce twice the energy developed by Hoover Dam, it is estimated. Hoover has an ultimate installed generating capacity of 1,317,500 kw., producing 4,250,000,000 kwh. of firm energy annually. The estimate for Bridge Canyon is 880,000 kw. capacity, producing 5,000,000,000 kwh. annually; for Glen Canyon, 655,000 kw., with 3,450,000,000 kwh.

● THREE CONTRACTS totaling $127,500 for rebuilding Los Angeles street lighting systems have been awarded to R. E. Ziebarth by the city's board of public works. These are the last of 12 contracts for the modernizing of equipment installed more than 20 years ago. The final group covers sections of Whittier and Sunset boulevards and Vermont Ave. To hold the cost of the improvements to a minimum, the present lighting standards are being raised from 18 to 25 ft., and the 2-light fixture is being replaced by a pendant containing one globe which will raise the present 8,000-lumen intensity to 10,000 lumens.

● CONTRACT for construction of an electrical distribution and street lighting system at the McNary Dam housing area on the Columbia River in Oregon has been awarded by Portland District Army Engineers to Ben Heunergard & Son, Portland.

Good-will Ambassador

Here's a product that's hard to beat for high quality and long-term service that keep customers flocking to your door. It's General Electric's Flamenol* cord set, the good-looking, practically indestructible cord-and-molded-on plug assembly that keeps lamps, clocks, radios, and other light appliances in use even though the cord is severely abused.

There is a big market for cord sets . . . and it's easy to see why. After five years in which little replacement work has been done, repair is badly needed. The *average* hotel room has four lamps that need attention, and *every* home has about eight. This adds up to sizeable extra business for you — and it is profitable!

It's easy to go after this business, and it's easy to get it, when you offer Flamenol cord sets for replacement. They won't fray or crack. They're a cinch to keep clean with a whisk of a damp cloth. The tough plastic plug can even be dropped and stepped on without breaking. Your customers will appreciate the *extra life* that Flamenol cord sets add to appliances. And these customers will remember that the good name of General Electric backs up the product. It's a name that means a lot to them, and to you, on cord sets and on every item in the full line of General Electric wiring devices.

*Trade-mark Reg. U. S. Pat. Off.

WIRING DEVICES by

GENERAL ELECTRIC

Wiring Briefs from your G-E Distributor

Are you familiar with the great variety of products in General Electric's full line of wiring devices? Do you know the interesting features that help to make them easy to use and safe to specify? Keep an eye on this column, and you may discover a lot of useful facts and information. We'll keep dishing them out for you.

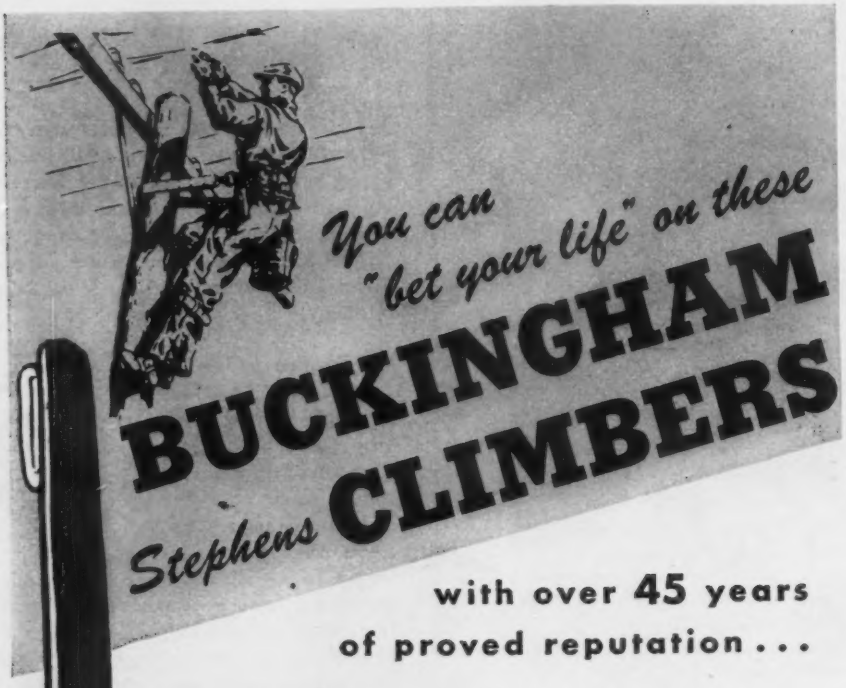
They Stay on the Job Till It's Time to Blow. This slogan tells in a flash why General Electric plug fuses help your customers to cut costs for maintenance and replacements. They aren't sissies —these fuses—liable to blow unnecessarily and keep repair crews on the run with fresh fuses. On the other hand, when they *should* blow — they *do* blow. Top-quality materials and fine workmanship combine to give outstanding protection — the kind that has made General Electric famous for fuses.

Here's a number that means "switches" to a good many quality-conscious and performance-minded users. It's GE 2841 — the switch that's built to last. Don't take our word for it alone! Ask the people who use this sturdy switch. They are our best salesmen, because they *know* that good old GE 2841 is reliable, gives excellent service, and has long life. Then try them yourself. We think you'll join the *GE 2841* fans, too.

Even "cool" lighting sometimes has to operate in hot spots when ambient temperatures are high. That's why the new, high-temperature rating of General Electric Watch Dog* starters means better operation for fluorescent installations. Now rated at 160 F (instead of 140 F), Watch Dogs stay on the job to protect ballasts and to cut failing lamps out of circuits. They make your maintenance work a lot easier. After relamping, just push the reset button, and it's ready to go to work again.

If you want additional information on these, or other G-E Wiring Devices, ask us — your General Electric Merchandise Distributor — or write to Section D68-925, Appliance and Merchandise Department, General Electric Co., Bridgeport 2, Conn.

say "G-E" and he'll agree



You can "bet your life" on these

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Stephens CLIMBERS

with over 45 years of proved reputation . . .

FOR QUALITY Superior workmanship, advanced design, and the finest materials are combined to give these famous Stephens Climbers a margin of quality unmatched for nearly half a century.

FOR SAFETY These rugged climbers are designed and tested with one principle in mind — *safety for the lineman!* Drop impact tests, magniflux tests, Rockwell tests, detailed final inspections . . . all give that *extra margin* that distinguishes *Buckingham safety.*

FOR COMFORT Here's why Buckingham Climbers are more comfortable, less fatiguing to the lineman . . .

- Shank gives a perfect leg fit. Climbers in all sizes, 14" to 20".
- Wide standing surface is slightly rounded to fit the foot.
- Round loop will not cut the straps.
- Gaff is hammer-forged from special tool steel, and properly located to support the foot of the lineman, causing less strain in climbing, maximum comfort in standing.

FOR DURABILITY The best materials plus high standards of experienced workmanship give these climbers a durability that guarantees years and years of heavy duty, rugged service.

Three different weights: Medium, light, feather. Straight and offset.

SEE YOUR DISTRIBUTOR
Now more than 400 outlets handling Buckingham Equipment.

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WORK PROGRAM ANNOUNCED BY USBR OFFICIALS

Following a Salt Lake City conference last month, USBR officials reported a $195,000,000 work program for the current fiscal year, reflecting appropriation cuts on only three major projects—Columbia Basin, Colorado-Big Thompson and Davis Dam.

Reclamation Commissioner Michael W. Straus said that appropriations plus carryover for the three projects are not enough to meet payments for the full year on contracts already let. The bureau estimates it is about $36,000,000 short on the three and will ask for deficiency appropriations for that amount from the new congress in January.

The Salt Lake City work conference was the first of its kind to be held outside of Washington, D. C. The centennial of irrigation in this country, coinciding with that of Utah's settlement, led to the Western city's selection as site for the meeting. It was attended by some 60 bureau officers from 17 states.

In the Columbia Basin, District Manager Frank A. Banks announced that every effort would be made to carry out existing construction contracts on a reduced basis through "voluntary programming" of work by contractors and by reductions in government forces.

● On Grounds that the project already was licensed, FPC last month denied request of the Idaho Power Co. for a new 50-year license for its hydro project on the Snake River near Hagerman. The company contended that acceptance of an amendment of the old license, granted in 1928, in effect would be an acceptance of a 23-year license for a new plant. It had intended originally to install additional generating units at the site but later decided to remove all existing equipment and build a new power house. Idaho Power's president, C. J. Strike, said that the decision will not interfere with the company's 60,000-kw. development at the site.

● Negotiations for rights of way for construction of the Central Valley Project transmission line on the west side of the Sacramento River were opened following congressional approval of a $1,500,000 appropriation. Phil Dickinson, assistant regional director of the reclamation bureau in Sacramento, said that it was expected available money will permit construction of about 30 miles of the line from Shasta Dam to Cottonwood, with completion in six months.

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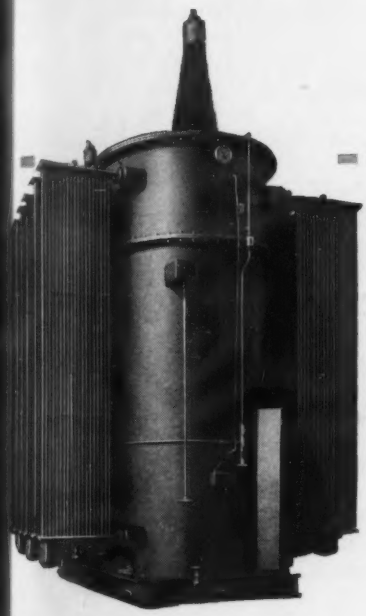
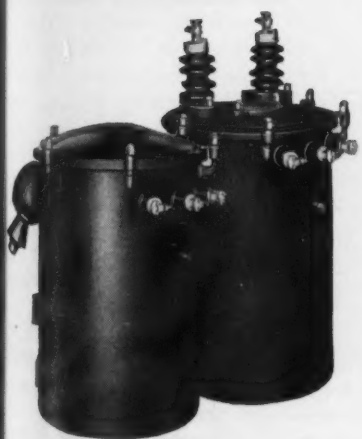
...less maintenance expense...longer life...
better performance proved by operating records!





POWER TRANSFORMERS

Research, with our 2,500,000 volt Surge Generator playing an important part, together with 50 years experience in the *exclusive* manufacture of transformers is responsible for the fine operating records users are experiencing with Moloney Power Transformers.

Modern design, workmen of long experience, highest grade material and adequate processing facilities are combined to produce these transformers.

DISTRIBUTION TRANSFORMERS

Moloney Conventional Distribution Transformers are widely used on utility distribution systems and in industrial lighting and power applications. Here too, Moloney's engineering and research have combined to make a superior product to fit your needs. Moloney Distribution Transformers are available in capacities from 1½ to 500 Kva, in voltages up to 66,000 volts.

MOLONEY MAKES

- Power Transformers
- Unit Substations
- Conventional Distribution Transformers
- Completely Self-Protected (CSP) Transformers
- Load Center Transformers
- Askarel (Non-Inflammable Liquid) Cooled Transformers
- Air-Cooled (Class A and Class B Insulated) Transformers
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ABolite REFLECTORS PORCELAIN ON STEEL

Whether it's indoors or outdoors, there's an ABolite reflector or floodlight to meet all requirements for efficient and economical illumination.

Made of finest quality porcelain on steel to provide and maintain greatest reflectivity. Recent plant enlargements and improvements, including a new continuous furnace, assure a constant supply.

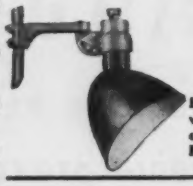
ABolite reflectors are available with all types of holders to meet every installation requirement.

RLM STANDARD DOME

Separable socket. Also made in threaded neck, heel neck and Duo-move.

DEEP BOWL

Formed neck type. Threaded and heel neck, quick detachable and Duo-move types also available.



OPEN TYPE FLOODLIGHT

Elliptical angle. Made with brackets for either open or concealed wiring. Easily adjustable.

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Wide-spread angle type. Also made in elliptical, rectangular and symmetrical angle.

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Do resistor problems "BURN YOU UP?"

Time was when a resistor consisted only of iron wire wound on a ceramic form—but that was long ago. Today, resistance unit specifications are so many and so varied that it requires the most extensive engineering application to solve the difficult problems they often embrace.

Here Driver-Harris lends a helping hand, with more than 80 electrical resistance alloys, designed to fill the numerous requirements of the Electrical and Electronic Industries. Best known and most widely used of this populous alloy family are — Nichrome* — Advance* — Manganin — Lohm* — and Midohm*. Singly, or in combination, these alloys are used in the majority of present-day resistance specifications—from precision bobbins to heavy-duty rheostats.

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Driver-Harris not only manufacturers and draws the most complete line of resistance alloys in the world — but also knows precisely how to use them. Get better acquainted with D-H alloys. Write for a copy of our latest 91-page Resistance Handbook R-46.

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HUNGRY HORSE TO BE FOURTH HIGHEST DAM

Revised plans for Hungry Horse Dam in northwestern Montana will make it the fourth highest dam in the world, according to R. J. Newell, regional director, USBR.

As now planned, a reservoir on the South Fork of the Flathead River will hold 3,500,000 acre-ft. instead of the 2,000,000 acre-ft. originally planned.

Anticipated installed capacity of the power plant is 286,000 kw. Water storage of 3,500,000 acre-ft. would increase by some 334,000 kw. the firm power capacities of existing downstream power plants at Kerr Dam and Thompson Falls, Mont., and at Grand Coulee, Rock Island and Bonneville dams on the Columbia. It would add 477,000 kw. to firm power capacities of power plants scheduled downstream as part of the projected development of the river.

A concrete dam approximately 535 ft. or higher will be required, Newell said, final height to be determined after further study.

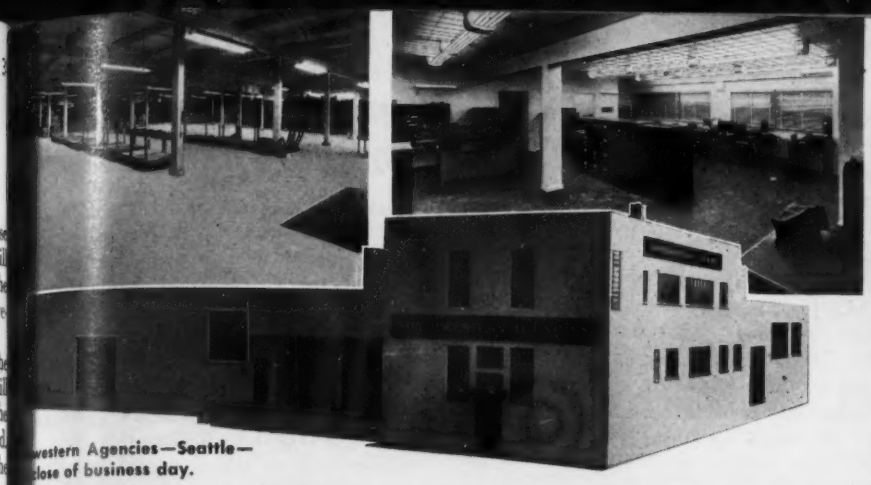
Officials Agree on One-Step Construction for Folsom Dam

Agreement on one-step construction for Folsom Dam on the American River above Sacramento, Calif., was reached at a meeting of Army engineers, USBR representatives and the California Division of Water Resources. The action will result in a $45,000,000 multiple-purpose structure with 1,000,000 acre-ft. capacity. Opponents of the one-step program had held out for a 600,000 acre-ft. storage now for flood control, with power and irrigation to come later.

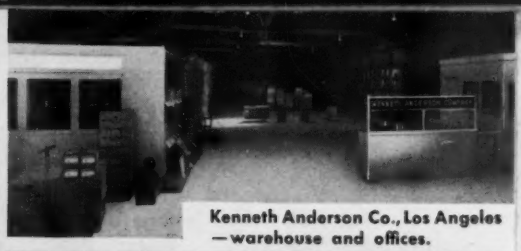
Instrumental in getting agreement on the larger dam was the concession by federal agencies that 400,000 acre-ft., rather than 260,000 acre-ft., of the storage would be charged to flood control. Construction costs for power and irrigation must be repaid.

The dam was authorized in the 1944 flood control act. The war and lack of agreement on the size have delayed construction. Construction funds will be sought from the next Congress.

● KETCHIKAN, Alaska, city council has approved change orders on a tunnel project to assure use of power from its Beaver Falls hydroelectric plant during the coming winter. The city has spent $625,000 on the power project and this cost probably will be increased to $700,000 before the plant is in use. The changes are estimated to cost between $27,000 and $47,000



western Agencies—Seattle—
close of business day.



Kenneth Anderson Co., Los Angeles
—warehouse and offices.

ior view, busy office and
ouse of F. M. Nicholas Co.—
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KILLARK'S QUALITY BUILDS BIGGER BUSINESS... *Killark agents expand to serve the increasing demand...*

New building of Geo. E. Anderson Co., Dallas, Texas. Interior view of warehouse prior to occupancy.

Featuring the complete Killark line, Killark agents have so increased their businesses that they are now finding it necessary either to expand materially their present facilities or to move to new and larger quarters. Backed by high standards of quality and consistent advertising in leading national electrical publications, the Killark line is a proven business builder. Featuring the complete Killark line has enabled wholesalers and contractors to meet exacting requirements and profitably outfit many jobs completely with Killark fittings—to increase their business, too.

The complete Killark line includes explosion-proof conduit fittings and lighting fixtures, vapor-tight lighting fixtures, conduit bodies and flush switch fittings for heavy-wall and thin-wall conduit. Do you have the latest catalogue of the complete Killark line? Send for it.

KILLARK ST. LOUIS

Killark

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WWP SCHEDULES FIVE-YEAR IMPROVEMENT PROGRAM

If materials and manpower are available, Washington Water Power Co. will spent about $3,000,000 a year for the next five years on construction in Washington and Idaho, according to J. E. E. Royer, vice-president and general manager.

The company early this year had outlined a near $3,000,000 construction program in Washington and Idaho, and since has increased that 1947 figure to about $3,500,000. A major item this year has been the rebuilding of the distribution system to increase capacity at a cost of about $1,000,000.

Of the proposed five-year expenditure, nearly half, or $7,000,000, is earmarked for Spokane, with $3,700,000 for improvements in the transmission and distribution system; $1,750,000 for new substations and improvements of those already in existence; $650,000 for modernization of the street lighting system and $800,000 for general improvements to the system.

Modern equipment and traditional craftsmanship together build the Gardner transformer. A typical operation—painting the tank for a 100 KVA oil-filled type in a water wash spray booth of latest design. The employee handling the spray gun has modern tools, equipment, and working conditions. He works in the Gardner tradition of quality workmanship in every detail, building a transformer that can be depended on for efficient, low-cost operation. Gardner Transformers Guard Profits.

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MUNICIPAL PLANNING $6,000,000 PROGRAM

A five-year, $6,000,000 construction program topped by a $2,000,000 steam generating plant has been announced by the Burbank, Calif., Public Service Department.

Manager J. H. McCambridge said this project, to be built adjacent to a present plant on Magnolia Blvd., will double the system's capacity. Burbank sells 14,000,000 kwh. monthly.

First step in the five-year program is a 25,000,000-gal. reservoir at the mouth of McClure Canyon, now under construction. Also under way is a $2,500,000 substation. A water pumping station and infiltration and softening plant and a water settling basin also are included in the construction program.

Court Prohibits Co-op Line-Building Program

Ma-Yu Electric Cooperative has been permanently enjoined by the Arizona superior court from further construction on an electric plant, line and system in western Maricopa County. Central Arizona Light & Power Co. had brought an injunction suit against the co-op, which started work eight months ago on 400 miles of line in eastern Yuma and western Maricopa counties. The court ruling also said that the Arizona company may extend its lines and system to serve the area in controversy.

● SIERRA PACIFIC POWER Co., Reno, Nev., has FPC authorization to issue $975,000 of first mortgage bonds to mature Aug. 1, 1977 with an annual interest rate of 2⅞%. Proceeds will be used to retire outstanding short-term promissory notes and to finance part of its present construction program.

● WASHOE COUNTY (Nev.) commissioners have granted a 25-year franchise to the Plumas-Sierra Rural Electric Cooperative for extension of power lines into the Red Rock and Black Springs areas in the northern part of the county.

● CHELAN COUNTY PUD, Wenatchee, Wash., has hired engineers to make studies preparatory to asking condemnation of Washington Water Power Co. properties in the area.

● WASHINGTON WATER POWER Co. has asked the Idaho Public Utilities Commission for approval of purchase of Pierce Light & Power Co. serving Pierce, Idaho.

Reliable

PULLING GRIPS
FOR AERIAL AND UNDERGROUND CABLE···

½ inch to 4 inch diameter.

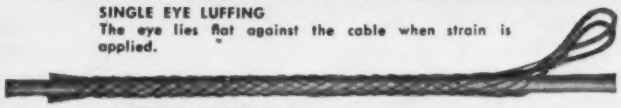
(¾" and 1" Dia. Single Weave)
(1 ½" to 4" Dia. Double Weave)

REINFORCED FLEXIBLE
● For pulling underground cables. Reinforcement protects wires of the grip at shoulder where wear is greatest.
Eye is formed of the wires themselves, and reinforced. There is no joint of the working end of the grip, no loss of strength.
End of each cable strand may be taped to cable insuring ultimate strength of all strands.
(Double Weave)

PLAIN FLEXIBLE
● Single weave grips for pulling aerial cable through rings without displacing them. Also used for small underground cables.
Double weave grips for pulling underground cables where wear does not warrant reinforced grips.

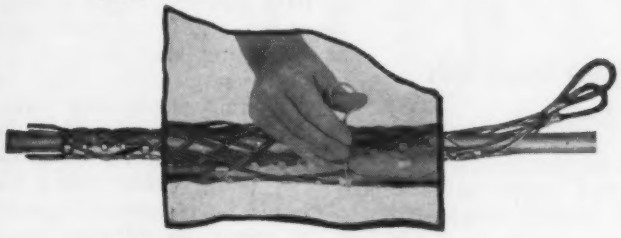
HARD WIRE
● These grips are very tough and stiff, and will withstand great wear. The grip must fit exactly for proper performance. For swabbing ducts. This grip can be packed with waste.
(Double Weave)

SINGLE EYE LUFFING
The eye lies flat against the cable when strain is applied.

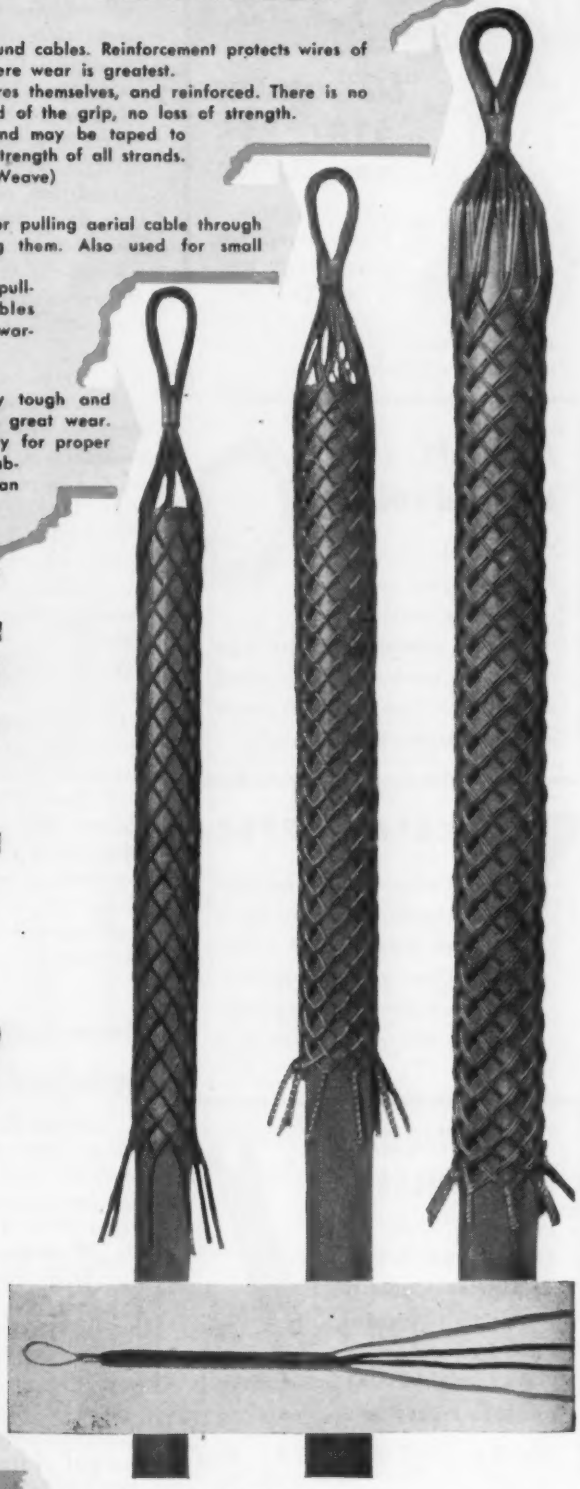


DOUBLE EYE LUFFING
Used for pulling out old cable in manhole or for pulling up slack.

SINGLE EYE SPLIT
For moving cables where end is not accessible. An arrangement of strong hooks, make the grip easy to apply, a small tool is furnished, or a small screwdriver.



DOUBLE EYE SPLIT
Application or removal of grip to cable may be done with minimum effort.
¾" Grips — supplied with rawhide lace 1½" to 4" Dia. steel hooks as shown.



MULTIPLE WIRE
● 5/16" to 1⅛" Dia. For pulling any number of wires through conduits.
When ordering, specify diameter of cable or total diameter of wires to be pulled.

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3145 CARROLL AVENUE
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DO IT EASIER with IDEAL TOOLS!

"E-Z" HAND TYPE STRIPPER and CUTTER

Triple action—clamps wire, cuts insulation and strips fast and clean, all at once. For stranded or solid wire. Blades replaceable. Eliminates wire waste.

FISH TAPE, REEL and PULLER

Three tools in one. Speeds wiring, saves tape. Gives workmen complete control—keeps tape reeled up, enables him to avoid contact with "live" parts. Prevents slippage, kinks, bends, breaks.

CABLE RIPPER

For use on non-metallic sheathed duplex cable or lead-covered cable. Cuts cleanly, quickly, easily—simply squeeze onto cable and pull. Gives long service.

"SAFE-T-GRIP" FUSE PULLER

No slip!—"finger fit" assures positive grip. Eliminates danger in replacing cartridge fuses by hand.

Write for detailed information on these money saving tools.

IDEAL INDUSTRIES, Inc.
Successor to Ideal Commutator Dresser Co.
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IDEAL *Distributed Through*
AMERICA'S LEADING WHOLESALERS

NORTHWEST FOUNDATION HOLDS ANNUAL MEETING

Re-electing its officers and board of directors for another year at a recent annual meeting in Portland, the Agricultural Engineering Research Foundation embarked on another year of investigation of the economic use of electricity on the farm and farm related industry. The foundation, established 1934, is the offshoot of the old original Committee on Relation of Electricity to Agriculture for Oregon and is supported by electric utility companies and farm equipment manufacturers. Research is carried on under the direction of the staff of the school of agriculture and the experiment station at Oregon State College, Corvallis.

Roy V. Stockton, a farmer of Sheridan, Ore., was re-elected president; vice-president is W. A. Schoenfeld, dean of the school of agriculture, and secretary is R. S. Besse, assistant dean of the experiment station at the college. Berkeley Snow, Northwest Electric Light & Power Assn., Portland, was re-elected treasurer.

Among projects for study during the coming year are: barn hay curing, garden pea shelling, drying and storage of Gladiolus bulbs, farm freezer tests, drying of pea vines at canneries with infrared light, developments in sprinkler irrigation, and control of litter moisture in poultry houses.

F. Earl Price, assistant dean of agriculture, O.S.C., who has been project director of the foundation since its organization, retired from this position, and J. B. Rodgers of the college staff was selected to replace him as project director.

Power Company Grant Aids Agricultural Research

A research project to study and develop new and improved drainage methods for Utah's irrigated lands has been made possible by a $10,000 grant from the Utah Power & Light Co., President Franklin S. Harris of the Utah State Agricultural College announced.

The Utah agricultural experiment station will carry on and help support the program. Need for the research is urgent, Dr. R. H. Walker, station director, said, explaining that one out of ten acres in Utah's drainage districts is poorly drained. "Miles and miles of closed tile drains have been plugged with silt and clay and have become inoperative," he reported.

● An FPC survey of Nevada power needs and potential power sources has been authorized by Nelson Smith, FPC chairman. The 1947 Nevada legislative session appropriated $5,000 for the survey, which originally was to be handled by the Colorado River Commission. However, at a meeting held in San Francisco with officials of federal power agencies, state representatives decided that a survey conducted by the FPC would be of greater value.

Farm Electrification Studies Financed by Idaho Utilities

Three power companies operating in Idaho have set up a $7,500 fund to finance a University of Idaho farm electrification research program, President J. E. Buchanan has announced. The Washington Water Power Co., Idaho Power Co. and Utah Power & Light Co. are the cooperating companies.

The program will be directed by a committee composed of a farmer and power company representative from each of the three power territories and five men from the school's agricultural and engineering divisions. Dean D. R. Theophilus, of the college of agriculture, will be chairman.

Idaho is one of the nation's leaders in farm electrification, with 89% of its farms served. The research is intended to improve present utilization of farm electricity, to discover new uses for electricity in farm production and to find ways to make electricity available to farms not now served.

● Members of the International Brotherhood of Electrical Workers have gone on strike against the city-owned utilities of Anchorage, Alaska, disrupting electrical power and telephone service. The strike came when the union, demanding wage increases of 17 to 19%, turned down an offer of 5%. It affected operation of all city power except pump lines, which would be maintained, the union said, to assure an adequate water supply. There are, however, a number of privately owned power plants in Anchorage, chiefly for large cold storage plants.

● IBEW members in Victoria, B. C., returned to work recently after a three-week "holiday" to press a suit for higher wages and better working conditions. The union electricians returned—without a new agreement—at the same time members of the Greater Victoria building trades went back to work after a legal holiday-with-pay week. The electricians are eligible for one week's pay out of the three weeks, contractors said.

SENSATIONAL...

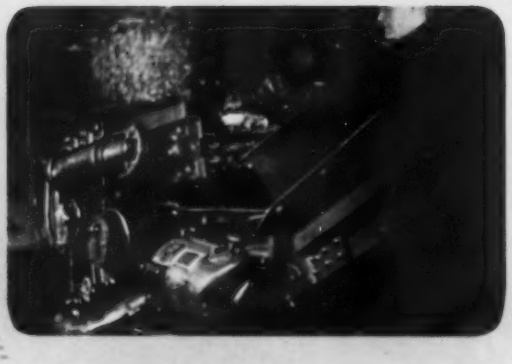
That's what the electrical industry is saying about the new, full-color motion picture "Watts in Glass".

Just released by Owens-Corning Fiberglas Corporation, it is now being shown to selected audiences from coast to coast.

Everyone who designs, manufactures or uses and maintains electrical equipment should see this interesting, informative and educational film.

Don't miss seeing it. Ask your Fiberglas* Electrical Insulation Material Supplier when it will be shown in your locality—or write: Owens-Corning Fiberglas Corporation, Advertising Dept., Toledo 1, Ohio, for information about special showings for your company, club or association.

NEW MOVIE *"Watts in Glass"* INSPIRES MANUFACTURERS



A leading manufacturer of electrical equipment sums up the reaction of designers and production men to this new color film when he writes: "'Watts in Glass' dramatically illustrates the way Fiberglas materials eliminate many design and production limitations."

Already many new designs and products, as well as product improvements, have resulted from the use of this material. Users of electrical equipment are expecting the benefits of Fiberglas Electrical Insulation in the products they buy.

Maintenance Engineers Amazed

Fiberglas Electrical Insulating Materials have been widely accepted as the answer to "tough" operating conditions. Yet, engineers, representing several leading concerns, have praised this colorful explanation of the reasons why its use results in improved operation and lower maintenance costs.

Not just theory but actual manufacturing plant shots show and describe the results of rewinding with Fiberglas Electrical Insulation. Actual time and dollar savings are explained.

Users of all types of motors can apply the facts to their own problems.

How You Can See This Outstanding Film

Bookings are arranged through Owens-Corning Fiberglas Corporation Branch Offices; through the Distributors, Wire and Cable Manufacturers or Processors of Fiberglas-base Electrical Insulating Materials. Get in touch with any of the above or write: Owens-Corning Fiberglas Corporation, Advertising Dept., Toledo 1, Ohio.

Group showings are being arranged now in many cities. Private showings, showings for clubs and associations and arrangements for the loan of the film, to a limited number of responsible parties, can be arranged, on request.

DON'T MISS SEEING "WATTS IN GLASS"—find out where and when you can see it—or arrange for a showing now.

OWENS-CORNING

FIBERGLAS

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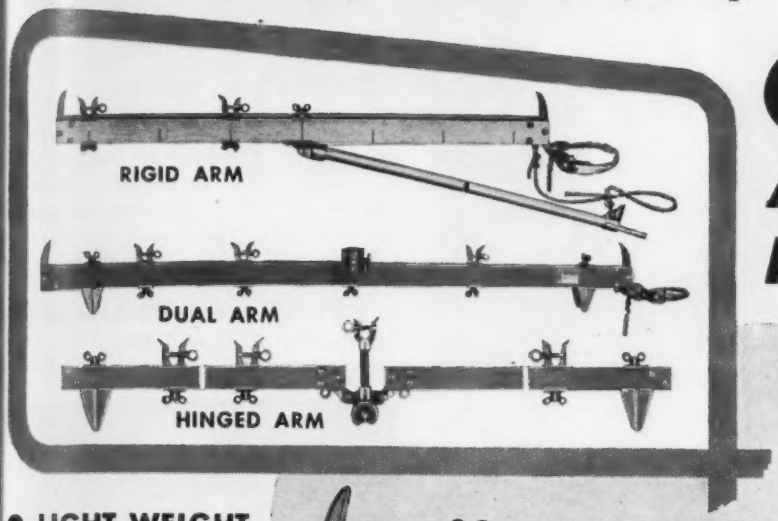
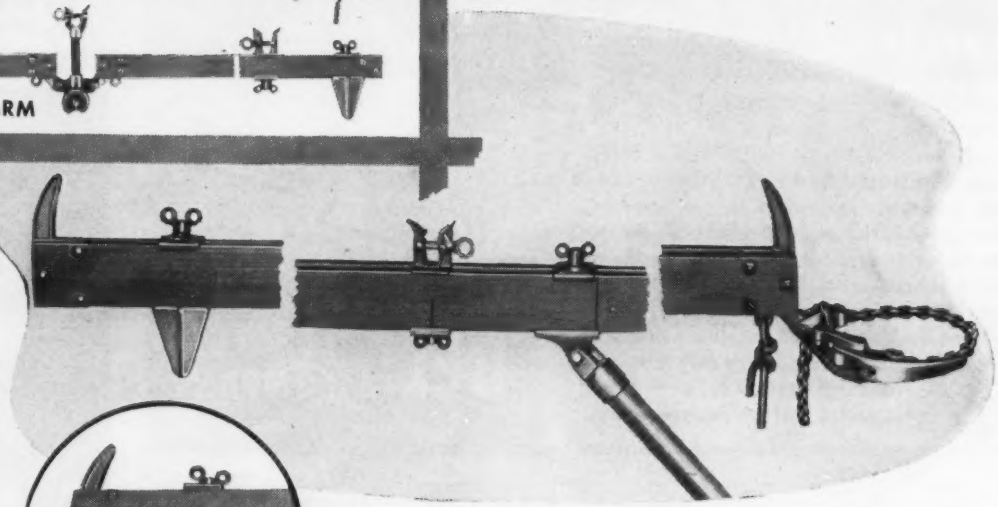
*Fiberglas is the trade-mark (Reg. U. S. Pat. Off.) of a variety of products made of or with glass fibers by Owens-Corning Fiberglas Corporation.

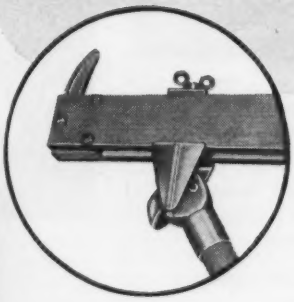
It's EASIER to Change
CROSS ARMS, INSULATORS, or POLES with

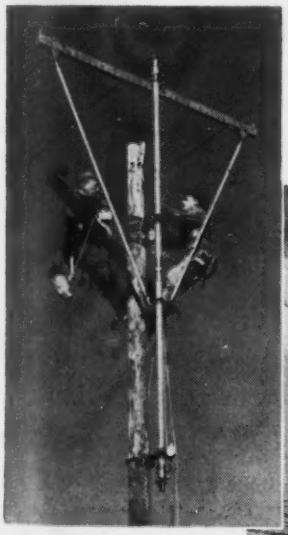


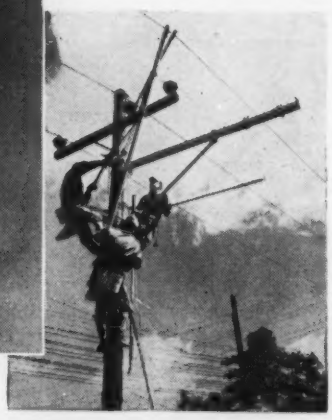
CHANCE
Aluminum Fitted
AUXILIARY ARMS

- **LIGHT WEIGHT**
  Use of aluminum alloy gives weight reduction up to 14 pounds.
- **VERSATILE**
  Can be used as side or lifting arm. Adjusts to construction.
- **EASY TO APPLY**
  Lever-operated chain tightener saves time and effort.









Replacements of poles, cross arms, or insulators on energized lines are easily made with the new, *lighter* Chance Auxiliary Arm. Like all Chance Hot Line Tools, Auxiliary Arms have been redesigned and mechanically improved by the use of heat-treated aluminum alloy fittings for all metal parts with the exception of wing nuts and wire holder pins. The new aluminum fittings are illustrated above. Weight reduction varies with the size and type of the arm—ranging, in some instances, up to fourteen pounds.

The easy-to-apply, safe locking chain tightener has won enthusiastic approval from hot line crews because it enables linemen to mount the arm on the pole with surprising speed and ease. Less time is spent in juggling of equipment up on the pole, and the lighter equipment is much easier to handle.

A new bracket on the dual and hinged arms (circle) can be gripped by a wire tong head so the tong may be used as a brace.

Chance Auxiliary Arms are available in three styles—rigid, dual, and hinged. They are made of especially selected spruce and are tested to 75,000 volts per foot. The rigid and hinged arms may be used as side arms or lifting arms. The dual and hinged arms can be adjusted to lift all conductors at once on ridge pin construction. Wire holders are adjustable to fit conductor spacings. Write for complete information on Chance improved tools.

"THERE'S NOTHING TOO GOOD WHERE LIFE IS AT STAKE" C4717A

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ABC INDUSTRIES

SELL SAFETY...

for consumer protection and increased profits

WITH NEW

NO-SHOK

CONVENIENCE OUTLET!

Promote SAFETY—prevent loss of life—with this accident-proof, heavy duty, NO-SHOK duplex receptacle. With its positive snap-back spring action, face is closed tight when plug is removed, thus assuring children and adults full protection from electric shock against which ordinary outlets cannot guard. Play safe—build sales, good will, and prevent tragic accidents.

Thick double walls of bakelite separating and insulating heavy duty terminals —lifetime spring action— firmer plug grasp, positive contact always.

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MULTIFLEX BRUSHES

for

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- **MORE UNIFORM WEAR**
- **LOWER OPERATING COSTS**

U. S. Pat. 2,181,076

Yes, Helwig-Speer Multiflex Brushes give you the "big three" of motor and generator performance. The best in design and materials means: (1) uninterrupted contact, (2) reduced vibration, (3) reduced circulation current, even wear. What's more, you get double-brush advantages with single-brush simplicity. Multiflex fits conventional single-brush holders. For complete information on ordering brushes, write for Catalog 95.

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SIGNAL ENGINEERING & MFG. CO.
Relays—Bells—Horns—Code Call Systems—Fire Alarm Systems

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Fuses, Oilers, Clip Locks and Fuse Pullers

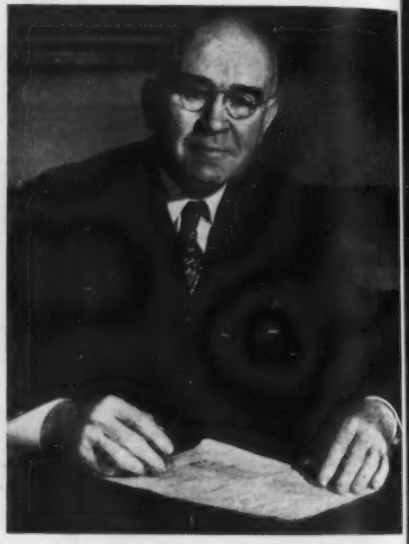
BURKE ELECTRIC COMPANY
Bakelite Controlead Terminal Blocks

NEWS ABOUT PEOPLE

Lewis A. Lewis Retires Following Long Service

Lewis A Lewis, assistant general manager of Washington Water Power Co. and Spokane division manager, has retired after 39 years of service. He was one of the pioneers in development of wide-spread electric use.

Son of a Cardiff, South Wales, merchant, Lewis went to Spokane with his family, and was graduated from Washington State College in electrical engineering. He started with the power company as a mechanic at the Ross Park steam plant in 1906 and soon after was transferred to the sales department to aid in a porch-street lighting campaign.



Lewis

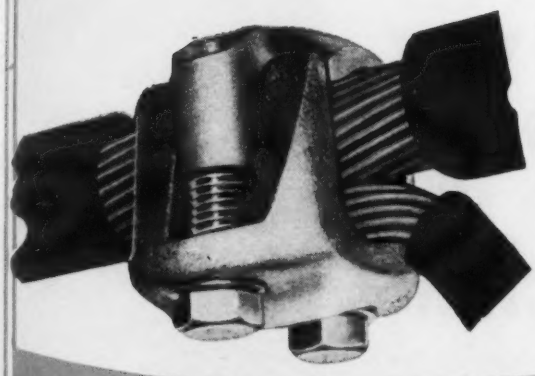
From 1923 to 1946, he headed the national electric range survey committee, comprised of experts from Spokane, Seattle and Boise, leaders in electric cooking equipment sales. A report by Lewis became the subject of study by industry men throughout the country.

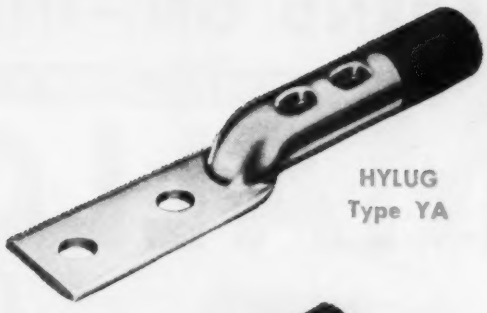
In 1910, Lewis became a member of the NEL&PA and in 1925 was elected its president.

● ALBERT T. BERGERON, former West Coast district sales manager for the Miller Co., has been appointed manager of the company's illuminating division.

● J. H. ROGERS, Idaho Power company treasurer, was elected a vice-president of the company by the board of directors.

OKLIP
Type KVS





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HYLINK
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Connect with

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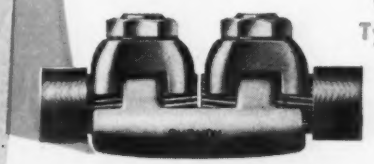
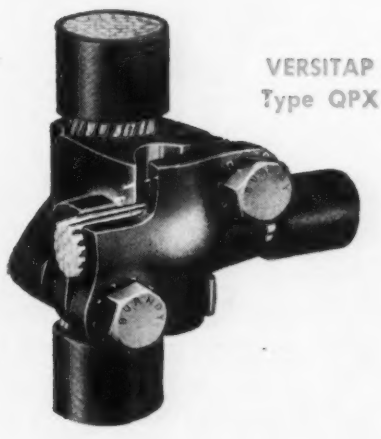


QIKLINK
Type QR-B

SERVIT
Type KS



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MALLORY

Capacitors

Mallory Type "P" Capacitor:—Plastic case overcomes moisture absorption problems, and provides maximum insulation. May be used to replace cardboard insulated aluminum-case capacitors. Splash-proof plastic end cap and simplified "snap on" mounting bracket available when capacitor is used as original equipment.

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Minimize your voltage losses. Specify scattered transformers to eliminate duplicate conduit runs, and save on power costs.

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CROCKER FIRST NATIONAL BANK
SAN FRANCISCO • OAKLAND
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Falge

● F. M. FALGE has been named manager of the General Electric Lamp department's Pacific sales district to succeed MORRIS C. HIXSON, who retired Sept. 1, after 12 years as manager. District headquarters are at Oakland, Calif. Falge, a U. S. Naval Academy graduate, joined G-E at Nela Park in 1926, specializing in stage and theater lighting, photographic lighting, sign, display and architectural lighting. He was in Los Angeles with the Lamp department in 1941, when he returned to active duty with the Navy. He held the rank of commander when he left the Navy in 1945.

● MORRIS C. HIXSON, who retired as Pacific sales manager for the G-E Lamp department, has been in the electric industry in the Bay area since 1906. He joined G-E in 1912 and subsequently originated and organized the building-equipment-specialist department, and served as consulting engineer on large theater, industrial, store and office building projects. He was named assistant manager of the Pacific sales district, G-E Lamp department, in 1931 and manager in 1934.

● NORTHERN ELECTRIC CO. Ltd. has announced the appointment of J. W. Fox as district service manager for British Columbia and Alberta.

● HAL E. SILVERNAIL, recently sales promotion man for Hotpoint district office, San Francisco, has joined the San Francisco branch of Graybar Electric Co., in charge of sales promotion for appliances.

Cut insulation costs with IRV-O-FLATSEME

*T. M. Reg. in U.S. Pat. Office

(sewed bias Varnished Cambric)

You can reduce your bias varnished insulation costs by using IRV-O-FLATSEME on windings and splices. Just tell us your bias tape requirements and we'll be glad to send a sample and give you the information needed to figure your exact savings. In addition, you'll get quick delivery.

IRV-O-FLATSEME – the original bias type flexible varnished insulation – is an established Irvington product. The sewed seam, occurring every 51 inches, is flat and does not interfere with taping. Coated with specially formulated Irvington insulating varnishes, IRV-O-FLATSEME provides insulation protection which is equivalent to that of Irvington Seamless Bias Varnished Cambric. Typical test data on this sewed bias insulation follows:

Thickness	Approx. weight, lbs. per 100 Sq. Yds.	Aver. tensile strength, lbs. per 1" width	Minimum elongation, percent at 25°C.	Load, lbs. per 1" width	Aver. short-time dielectric strength, V.P.M. before elongation (¼" electrodes)		Min. average short-time dielectric strength, V.P.M. under 6% elongation (¼" electrodes)	
	Black & Yellow	Black & Yellow	Black & Yellow	Black & Yellow	Black	Yellow	Black	Yellow
.005"	28	20	6.0	5	1100	1050	700	550
.007"	40	20	6.0	5	1100	1050	800	600
.010"	54	24	6.0	6	1200	1050	900	700
.012"	60	24	6.0	6	1300	1050	1000	800

Above values on insulation do not include seam. However, tests show total breakdown across the seam of this sewed bias insulation is about the same as that of a single thickness of the insulation. The tensile strength on the seam is approximately 75% of the values given above.

IRVINGTON INSULATION

"Look to Irvington for continued leadership in insulation."

IRVINGTON

VARNISH & INSULATOR COMPANY

IRVINGTON 11, N. J.

the MECHANICAL hand that takes the chance out of lamp-changing

You can't take chances on plant-safety. The NEW McGILL Lamp Changer RULES OUT bulb-changing chances. Constructed with rubber-covered fingers and a coil spring around the finger tips which grips and removes the bulb. McGILL Lamp Changer Poles have a 1¾" insulation-insert to prevent shock. Available in lightweight 5-foot lengths to a 30-foot maximum. McGILL Lamp Changers stop the threat in old-fashioned bulb-changing methods, halt risky ladder-climbing, box and chair-balancing, and the ever-present danger of shock and burn. Don't wait for a CHANCE accident to help you decide. Order a McGILL LAMP CHANGER from your jobber.

McGILL
MANUFACTURING CO., INC.
Electrical Division
VALPARAISO, INDIANA

● BETH MCCRONE, illuminating engineer and director of domestic lighting for the San Francisco division Pacific Gas and Electric, has joined the General Electric Co. lamp department organization, at Nela Park, Cleveland. Miss McCrone, a member of IES, will work under Monty Cutler in the lighting for sales activities at Nela Park. She received architectural and lighting training at Stanford University; worked for Incandescent Supply Co., San Francisco, as a consultant; and during the war did electrical and lighting layout for Columbia Steel and Western Pipe & Steel in shipbuilding. Aboupt a year ago she joined Pacific Gas and Electric. She has just returned from a trip to England, Holland, France, Switzerland, and Sweden, on a leave of absence during which she observed lighting trends and developments in those countries.

● MANAGERSHIP of the newly formed Hayward district of Pacific Gas and Electric Co. has been taken over by KENNETH C. PORTER, succeeding W. D. OSWILL, who retired July 1 after 41 years of service with the company. Porter, formerly local PG and E manager at Colusa, is a veteran of 23 years. Succeeding him as local manager at Colusa is A. J. PETSCHE, who has been agent and local manager at Niles since 1930. Other changes in the East Bay area include appointment of: PETER D. JUHL, local manager at Niles; ROGER ANDERSON, commercial representative at Hayward; ALDEN MOORE, commercial representative at Berkeley; and DAVID HANSEN, chief clerk at Hayward.

● J. SCOTT MILNE, for a number of years international vice-president of the International Brotherhood of Electrical Workers for the ninth district, with headquarters at San Francisco, has recently been appointed international secretary of IBEW with headquarters in Washington, D. C. O. G. HARBAK has been made international vice-president for the ninth district in his place.

● ROBERT LEE, formerly of the publicity department, Los Angeles Department of Water & Power, and later with an advertising agency, has taken over the post of advertising and sales promotion manager for Leo J. Meyberg Co., Los Angeles, succeeding EARL GERMAINE, who has been advanced to sales manager for the Bendix division.

● MEL G. KENNEDY has been appointed advertising manager of the Kansas Power & Light Co. at Topeka, Kansas. Kennedy both prior to the war and after he returned from service was connected with Pacific Power & Light Co.'s advertising department.

Insulating Varnishes
Enamels
Synthetic Resins
for
Industrial Purposes

manufactured by
Schenectady Varnish Co.

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Industry Approved
USED FOR OVER 40 YEARS
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Immediate delivery from local stocks

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ALL the strength and durability inherent in steel are combined—with definite economies—in *Crapo* Galvanized Steel Strand. Heavy, ductile, tightly-bonded zinc coatings, applied by the famous *Crapo* Galvanizing Process, provide lasting protection against corrosion.

Ask the distributor of *Crapo* Galvanized Products near you or write direct for further information!

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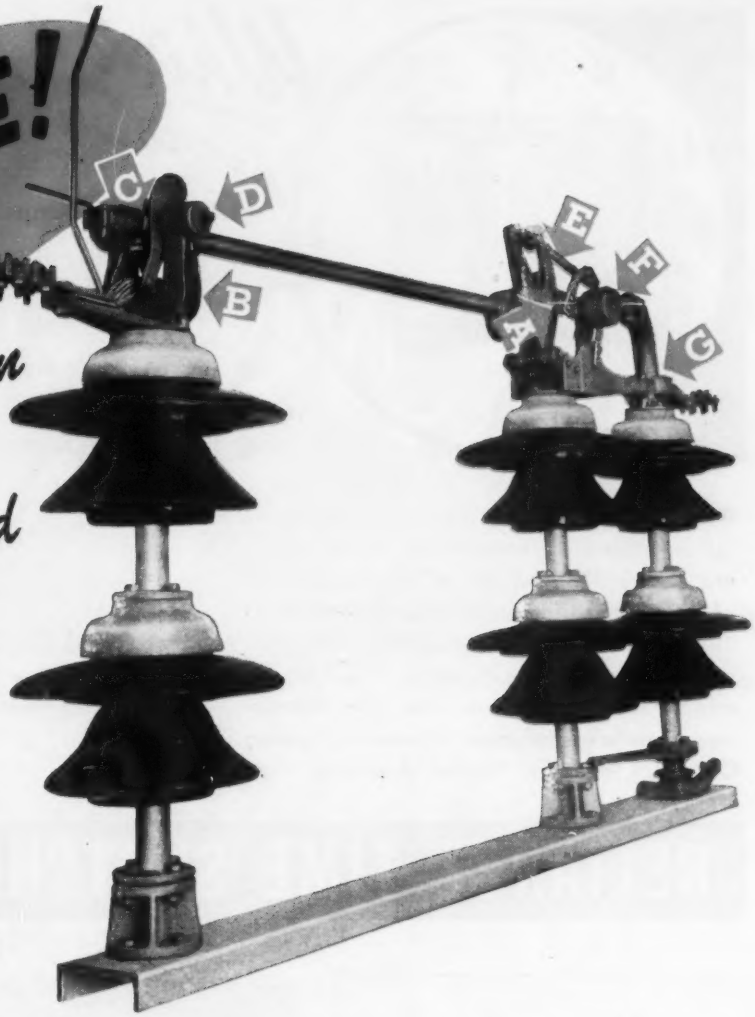
Rugged Construction
Sound Design
Field Proved



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GANG OPERATED
DISCONNECT SWITCH

A Troublesome hinge end contacts eliminated by correctly* engineered, non-corrosive, copper braid shunts of more than adequate current carrying capacities.

B Floating, self-aligning and self-wiping jaw assures clean, dependable electrical contact under all operating conditions.

C Wedge-shaped, blade contact shoes expand jaws to make tight, positive high pressure contact.

D Sturdy, adjustable stainless steel springs, in weather-proof housing provide powerful back-up to jaw contacts.

E Mechanical linkages with fixed bearings provide smooth, fully-controlled blade operation at all stages of opening or closing movement.

F Perfect blade balance is maintained by torsional-type, weather-protected stainless steel springs.

G A lifetime of smooth operation is assured by non-corrosive, ball bearing which never requires lubrication.

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69KV 600 Amp.
Available in ratings
from 7.5KV to 230KV.
400 Amps. to 1200 Amps.
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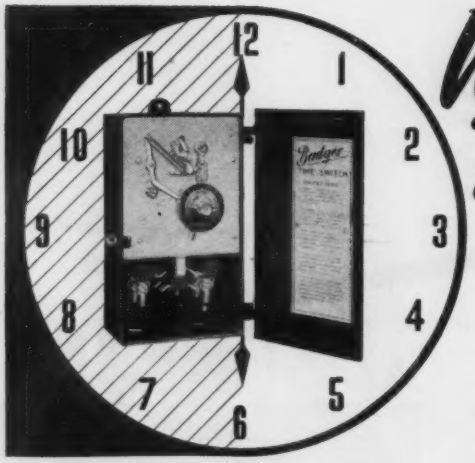

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● Reliance Time Switches — our customers tell us — are well-named. Many say our standard electric time switches meet practically all of their automatic control requirements. Some users have enjoyed dependable Reliance service for more than 35 years. You, too, can rely on the Reliance line. Ask your distributor or write — Reliance Automatic Lighting Co., 1939 Mead St., Racine, Wisconsin.

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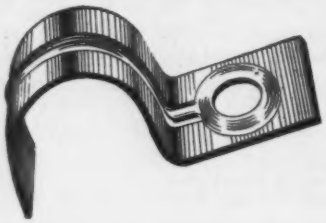
Hansen

● J. M. HANSEN has been appointed appliance manager of the Salt Lake City branch of Westinghouse Electric Supply Co. He has been with the electric industry for 20 years, was employed by Utah Power & Light Co. from 1927 to 1929 and again from 1934 to 1936, and for a time was with the Edison General Electric Appliance Co. He joined Westinghouse Supply in 1936 as sales representative in Salt Lake City and has served there until his recent appointment.

● APPOINTMENT of WILLIAM C. GALLATIN as meter specialist for Westinghouse Electric Corp.'s central station sales division, Pacific Coast district, was made recently by W. P. L'Hommedieu, Pacific Coast manager. Gallatin, who will be headquartered in San Francisco, succeeds J. E. Bridges, retired following 40 years with the company. He joined PG and E soon after graduation from California Polytechnic College in 1938; was attached to the Army Air Corps during the war, receiving an electrical engineering degree under the Army specialized training program.

● G. S. PERKINS, receiver representative for General Electric in northern California and Nevada, has been appointed sales manager of G-E's musaphonic line. He left for Bridgeport, on June 1 to assume his new duties. Perkins served G-E Supply Corp. for six years in a merchandising capacity before entering the naval service in 1941. He was awarded the Navy and the Army commendation medals for outstanding service, returning to civilian life with the rank of captain.

Minerallac JIFFY CLIPS



SAVE TIME when hanging pipe, conduit, BX cable, etc., by using these strong ribbed JIFFY CLIPS. Only one bolt or screw is required. Their expert design and quality materials will assure long, trouble-free service at a surprisingly low cost.

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electric or air actuated, will solve your signalling problems. Easily installed, these powerful, penetrating signals have a quick cut-off, may be coded to convey a variety of messages. Built to live in industrial locations, weather and water proof; heavy construction of corrosion proof metal insures long life, dependable operation.

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If you want to know more about the fine qualities of Simplex - ANHYDREX Underground Cables, we will be glad to send you a copy of the new edition of the ANHYDREX Underground Cable book, dated April, 1947. Write for Bulletin 985-A.

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● FRANK E. BODINE has been advanced to Pacific Coast manager of maintenance sales for the Westinghouse Electric Corp., with headquarters in San Francisco. He will serve the company's entire Pacific Coast district, plus Alaska and Hawaii. For 21 years Bodine has been with Westinghouse, serving as sales manager at Salt Lake City for three years, and since 1944 as sales manager in the San Francisco offices.

● VIVIAN WRIGHT PINNEY, who during the war served as a WAVE in the U. S. Navy at Corona, Calif., and prior to that was home service advisor for the Rapid City branch of the Montana-Dakota Utilities Co., has become a member of the home economics staff of the Crosley division, Avco Mfg. Corp.

● DAN M. FINCH, assistant professor of engineering, University of California at Berkeley, has been conducting a course on the fundamentals of illumination engineering in cooperation with the IES, Southern California Section, at the University Extension Center, 813 S. Hill St. Los Angeles. Finch directed a similar course at the Berkeley campus earlier in the year.

● ALEX KUEHLTHAU, district manager of Electromaster Inc. has moved to 7309 50th Ave. N. E., Seattle 5, Wash. He recently assumed district managership again for the entire Western area upon the resignation of BEN SANDERSON, who joined Deepfreeze Inc.

● HUGO BECKER, engineer handling supervision of service and industrial maintenance of Westinghouse Electric Corp., San Francisco division office, left that company recently to join E. W. WISMER in the contracting business which he and his late partner "Doc" Cates had formed a little over a year ago. Cates disappeared during a flight from Sacramento to Reno and the plane wreckage has not been found.

● HENRY M. TILSON, electrical engineer who has been connected with many projects, particularly the electrification of the San Francisco-Oakland Bay Bridge, has recently joined Haynes Electric Co., Oakland, as electrical engineer.

MANUFACTURERS REPRESENTATIVE WANTED

Manufacturers of light, flexible shaft units and flexible shaft hand tools for filing, hammering, and grinding are seeking a responsible and aggressive organization to act as sales representative in exclusive territory. Products are in demand by all industries from large manufacturing plants to the smallest shops. No competition. Adequate sales support given right party. Remuneration will exceed your expectations.

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Joslyn J1131, 50c ea.
Located at Pasco, Wash.

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Located at Portland, Ore.

These new galvanized clamps are complete with nuts and bolts and are packed in original boxes. Prices quoted are f.o.b. location.

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It pays just as big
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1½, 2 & 3 Horse Power *sizes only*, single phase 110-220. Also totally enclosed 3 phase motors in 1½, 2, 3 and 5 H.P. Mfgrs. of A.C. Generators, Rotary Converters, Lighting Plants, Frequency Changers and High Frequency Generators.

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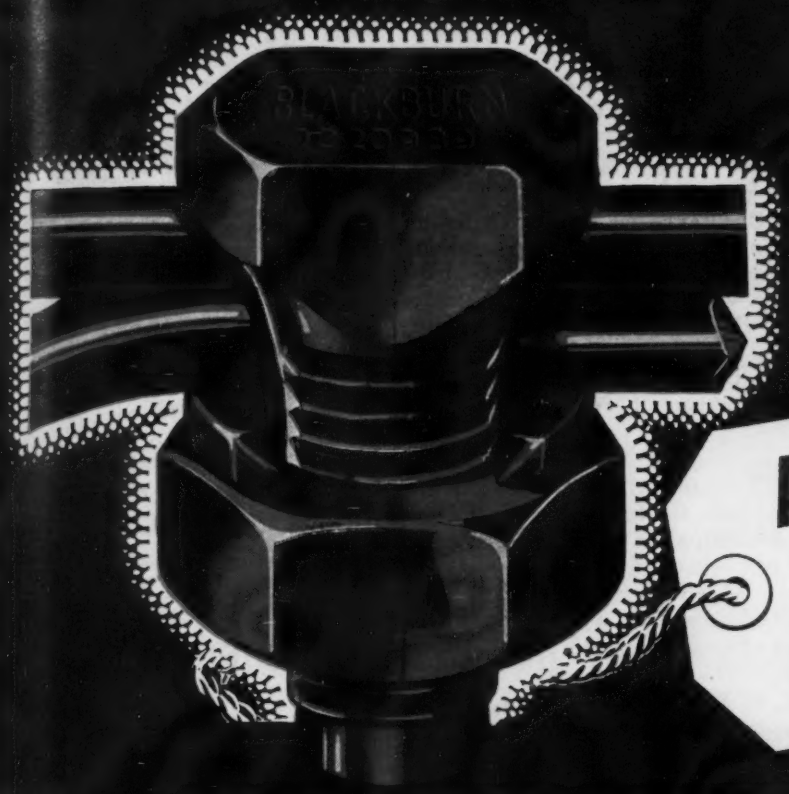

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CUTS YOUR MAINTENANCE COSTS IN THESE 4 WAYS:

BLACKBURN CONNECTORS cut costs because years of experience have proved them to be trouble-free on the line. That's due to their high-strength construction—of DURONZE, which is **50%** stronger than hard copper or commercial bronze.

BLACKBURN CONNECTORS cut costs because they produce a more efficient connection. Tests show that the conductivity of the connection is actually better than the solid wire itself. This superior conductivity is retained through years of service.

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Especially in these days of rising labor costs, it pays to use a QUALITY Connector—a connector which once put on, is there to stay! Buy BLACKBURN from your Jobber today!

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BLACKBURN *Hi-Strength* CONNECTORS

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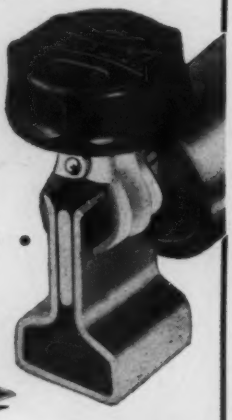

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literally bolt fuses and clips in a vise-like manner!

Poor clip contact causes . . .

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A heavy-duty clamp for temporary connections, motor and meter testing, jumpers, etc. It stays put. Seven sizes, 0 to 300 Amps.

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● DANIEL F. FLINN, II, recently joined the organization of General Electric Co., San Francisco division office, taking charge of the construction materials department during the absence of JOE GILLINGHAM on a trip to Scotland. Flinn, who came from Bridgeport, Conn., later will make the West Coast his permanent location.

● J. D. FRANTZ has been promoted to superintendent of the underground department of the Pacific Power & Light Co. He was with the General Electric Co. at Portland for eight years before joining Northwestern Electric Co. in 1933. His recent advancement followed merger of Northwestern and Pacific.

● J. R. GABBERT after 17 years of service with California Electric Power Co. has retired as advertising manager and editor-in-chief of the *Calectric Bulletin*. A veteran in newspaper work, Gabbert has opened a newspaper brokerage office in Riverside.

● E. C. BRANCH of Seattle, has been elected chairman of the Washington State Chapter of the Illuminating Engineering Society. K. E. Hollingsworth is the secretary-treasurer while B. T. Heinz, Elmer Favro and Earl D. Gilpin were named to the executive board.

● LEONARD A. TAYLOR, who prior to the war was associated with the Stromberg-Carlson Co., is now affiliated with the Wresco (Wholesale Radio and Electric Supply Co.) of San Francisco.

Deaths

● BERT E. ROWLEY, Hotpoint district manager for the Rocky Mountain Region for many years, died after a short illness Aug. 2, in Salt Lake City. He had been prominent in the affairs of industry over many years, was president of the Electrical League of Utah in 1927 and was soon to retire.

● R. G. HUTCHISON, Pacific district regional manager for the Frigidaire Corp. almost since establishment of West Coast offices, died recently after a short illness.

● MAURICE ERWIN, with Westinghouse Electric Supply Co. in Oakland, Calif., for the past 17 years, died last month.

● MISS MILDRED ELROD, home service director, Northwestern Electric Co., died in Portland. Miss Elrod had been home service director for the past ten years and was well-known throughout the Portland area.

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Units Now Available

ARCHITECTURAL
—For Modern Store Design
- Recessed Lens "Sightlites"
- Louvred Downlights
- Adjustable Eyeball "Accentlites"
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THEATRICAL
—For Flexibility and Control
- "Theatrelites"—Stage Spotlights
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- Borderlights
- Disappearing Footlights
- Floodlights
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—For Accenting and Flooding
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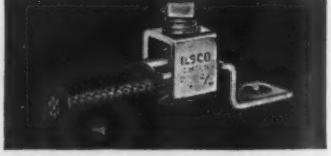
ILSCO
LUGS AND CONNECTORS



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Also: Note These Features:

STRONGER CONNECTION . . . because wires are wedged into V-bottom.

STRONGER GRIP . . . because top pressure bar is serrated.

STRONGER PRESSURE . . . because deep boss provides more threads.

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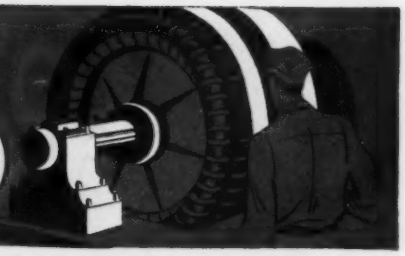
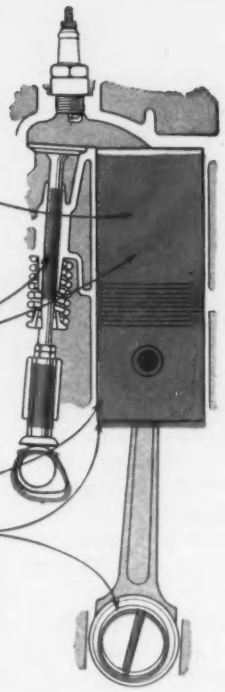
STANDARD ENGINEERS NOTEBOOK



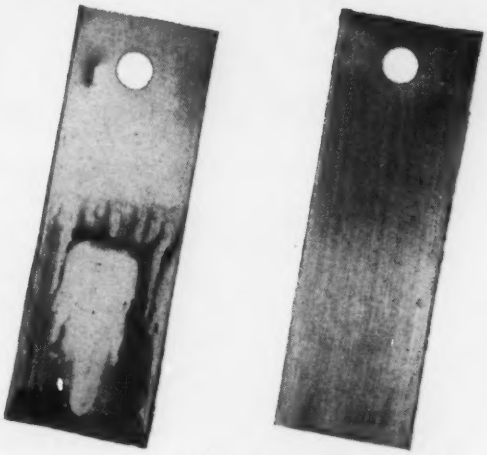


① Adhering agent in RPM Compounded Motor Oil keeps oil film on all parts after engine stops, even on cylinder walls.

② Rustproofing compounds prevent moisture that condenses on cooling parts from contacting metal.

③ No rust is formed to scrape off when engine starts, and cause excessive wear.

④ Constant lubricant film provides adequate and instant lubrication when engine starts.



This actual photograph shows how one HIGH-QUALITY MOTOR OIL "peeled" off almost all of this test strip of steel when it was placed in corrosive-moisture conditions similar to those in a cooling engine. The oil concentrated at one spot and the unprotected surface quickly rusted.

RPM COMPOUNDED MOTOR OIL kept this strip bright and shiny, completely sealed against rusting, when it was exposed to the same conditions. "RPM" compounds keep a constant rust-proofing lubricant film on engine parts at all times, whether they are idle or moving.

How RPM Motor Oil Rust-Proofs As It Lubricates

Rusting, caused by corrosive moisture, is the greatest source of wear in automotive engines (85%, according to some engineers). It can be controlled by using RPM Compounded Motor Oil.

Additional compounding for "RPM," perfected by Standard of California scientists, provides a rust-proofing lubricant film on internal engine surfaces. The heaviest moisture condensation in idle or cold-running engines will not cut through it.

Other compounds in RPM Motor Oil give it adherent qualities so the film stays on parts at all times. They also loosen and remove gum and lacquer, lubricate hot spots, resist sludge formation, bearing corrosion and stop foaming.

Trademark "RPM" Reg. U. S. Pat. Off.

Standard Fuel and Lubricant Engineers are always at your service. They'll gladly give you expert help — make your maintenance job easier. Call your local Standard Representative or write Standard of California, 225 Bush St., San Francisco 20, California.

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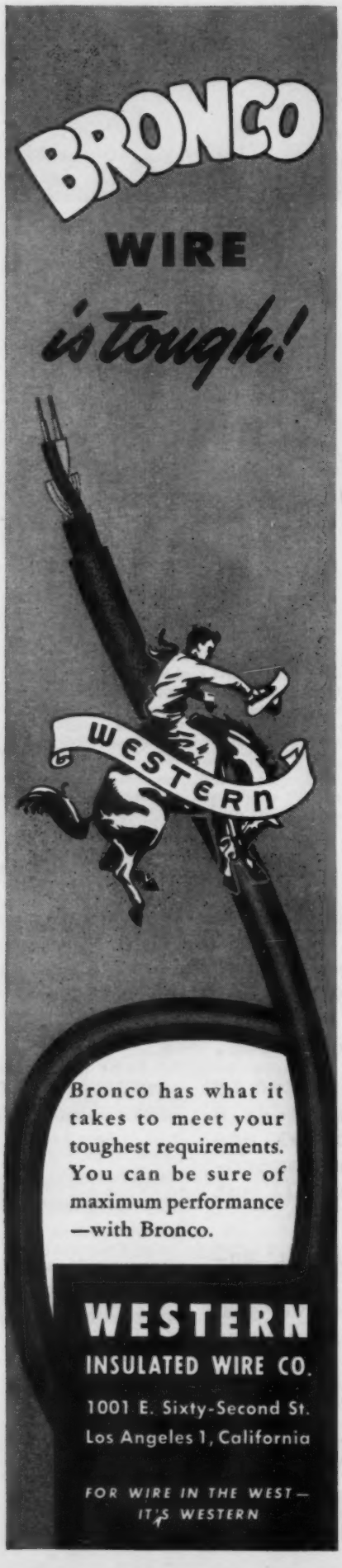
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Bronco has what it takes to meet your toughest requirements. You can be sure of maximum performance —with Bronco.
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INSULATED WIRE CO.
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FOR WIRE IN THE WEST— IT'S WESTERN

NOTES ON THE TRADE

● ROCKBESTOS PRODUCTS CORP. of New Haven, Conn., manufacturers of insulated wires, cables and cords, opened offices and warehouse at 3100-3134 E. 10th St., Oakland, on Aug. 16. PHILIP O. WESTON is district manager for the Pacific Coast territory. When space is available another sales office is to be set up in Los Angeles.

● ELECTRICAL APPLIANCE SERVICE CORP. has announced an official parts and service department for Monitor Home Appliances, with offices at 236 Harriet St., San Francisco; 726 Venice Blvd., Los Angeles; and 302 17th St., San Diego.

● JAMES O. TURNER, for many years with Westinghouse Corp., has joined Zinsco Electrical Products as San Francisco district manager with sales office at 544 Market St. The company is owned by Emil Zinsmeyer of Los Angeles. It will handle switchboard equipment.

● RECENT APPOINTMENTS of the Jud Whitehead Heater Co. include the promotion of J. C. THOMPSON to the position of general sales manager; appointment of MANUEL PINHEIRO, Oakland, as district sales manager for the Pacific Coast.

● FRANK I. DU FRANE CO. has moved its offices to 1063 Howard St., San Francisco 3. The company is the agent for Lake Mfg. Co., Hart Mfg. Co., Major Equipment Co., and Frank W. Morse Co.

● CHARLES HOLGMULLER, pioneer in stage and theatrical lighting equipment in San Francisco, retired Aug. 1, selling his business to Archer Munson, who has been handling theatrical lines as well.

● J. N. CEAZAN CO., formerly only a tire distributor and recently a major distributor of radio and appliances, is to have a new building in San Francisco at Ninth and Harrison Sts., in addition to its display and office in the Western Merchandise Mart.

● MANUFACTURERS MARKETING SERVICE, Menlo Park, Calif., announces that its line of miniature fluorescent lighting units is being made available nationally.

Hogenson

● NEWLY APPOINTED representative in northern Idaho, Oregon and Washington for the Edwin F. Guth Co., St. Louis, Mo., is OSCAR HOGENSON, who will make his offices at 95 Connecticut St., Seattle 4 .

● NEW DISTRIBUTOR on the West Coast for the Iceberg Refrigerated Locker System Inc., N. Y., is the MacLENNAN CO., 2020 J St., Sacramento.

● C. P. CLARE & Co. has opened a Denver sales engineering office at 682 Grant St. CLYDE P. ELLIOTT, recently appointed Clare representative for the Mountain states, is in charge.

● L. W. THOMPSON, manufacturers representative, has announced the opening of new and larger offices at 232 S. Hill St., Los Angeles. His son W. L. Thompson, is now associated with him in the business.

● J. T. BROWN of Helwig Co.'s San Francisco office, has announced a change of headquarters. The Helwig Co. is now located at 420 Market St. in San Francisco.

● COPPERWELD STEEL CO. has moved its Pacific district office to Room 545 Monadnock Bldg., 681 Market St., San Francisco 5.

● JOHNSON's Radio & Electric Ltd. registered offices at 1433 Lonsdale Ave., North Vancouver, B. C., was recently incorporated with 100 shares of N. P. V.

● C. W. MAIN has been made a field representative of the Plomb Tool Co. with headquarters in Denver, Colo.

Accessibility OF PARTS

Means Simple, Easy, Time Saving Maintenance of KEARNEY-MARTIN MULTIPLE RELAYS

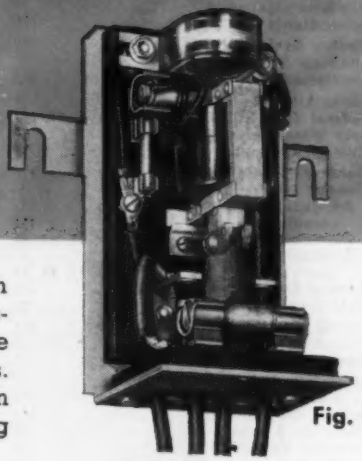

Fig. 1

FOR control of outdoor multiple lighting circuits, the Kearney-Martin relay offers years of positive operation with a minimum of maintenance. The Kearney-Martin relay is equipped with long-life, 30 ampere silver contacts and can be supplied in normally closed or open types. Protective accessories include a 3 ampere fuse in the coil circuit, an optional 30 ampere fuse in the load circuit, and an optional lightning arrester to by-pass surges around the coil and fuse.

However, when service is needed, this relay is very simple to repair. Remove the cover, and all parts are readily accessible for inspection. (See Figure 1).

Figure 2 shows how easily the operating assembly can be removed from the front of the assembly without tools.

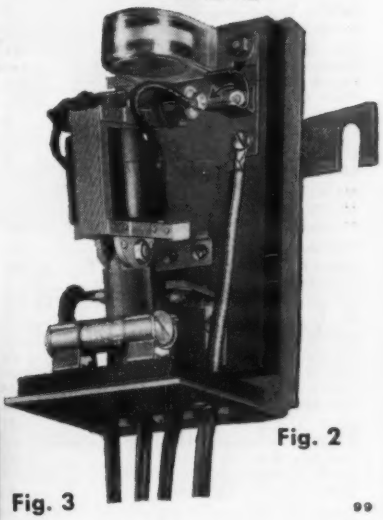

Fig. 2

Now look at Figure 3. Without removing a single screw from the relay mounting, the coil is quickly replaceable from the front of the assembly. Simply remove the coil retainer and the coil readily slips out of the frame.

Fig. 3

Ease of replacing parts of the Kearney-Martin relay eliminates the necessity of carrying entire relays on service trucks and reduces "pole-top" repair operations.

For Better Results

Specify Kearney Products

MAYDWELL & HARTZELL
INCORPORATED
LOS ANGELES • SAN FRANCISCO • PORTLAND • SEATTLE

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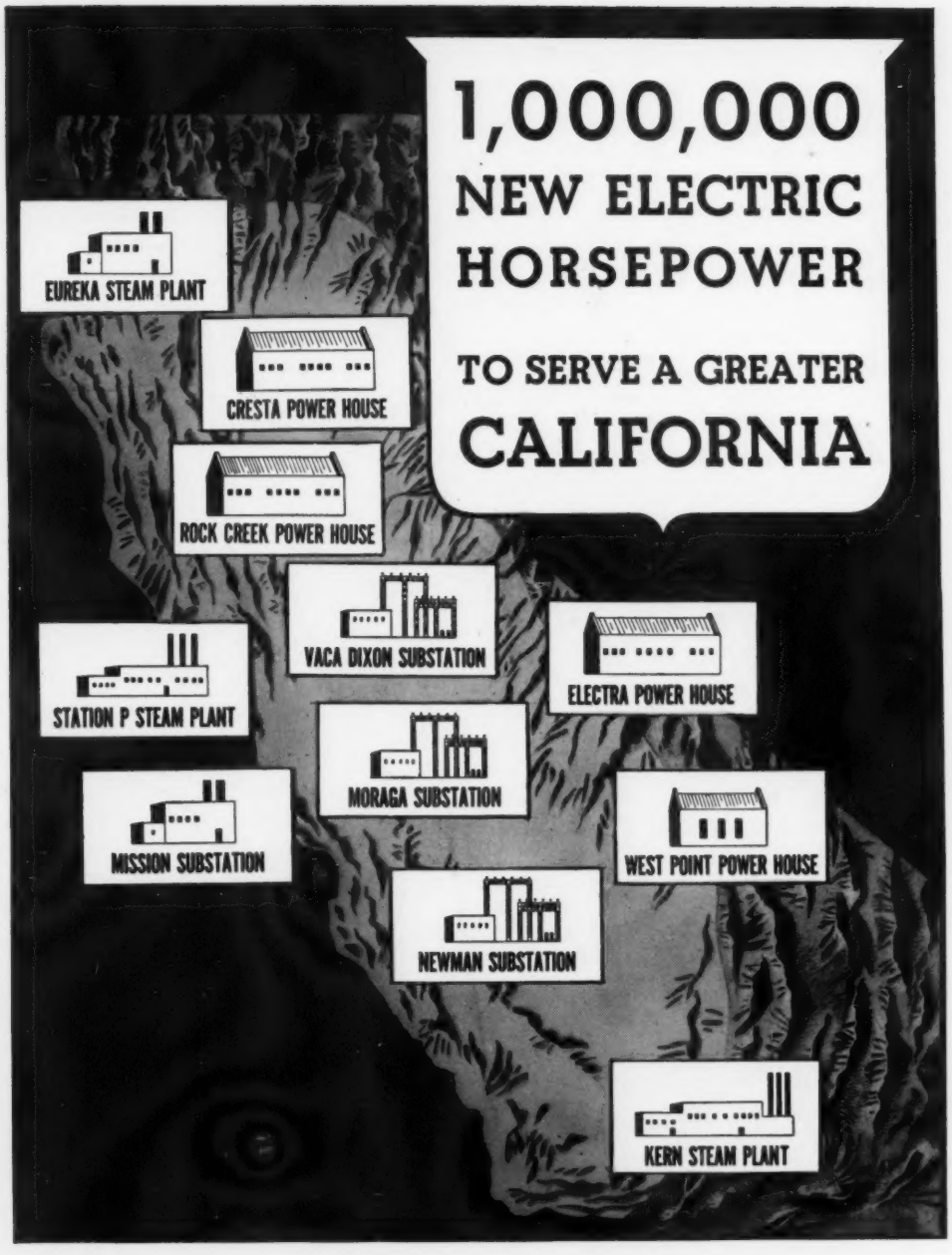
PROFILES

Left: At annual meeting of Agricultural Engineering Research Foundation, Portland (standing) R. V. Stockton, Sheridan, president; W. A. Schoenfeld, dean of agriculture, OSC, Corvallis, vice-president; (seated) J. B. Rogers, OSC, project director; F. Earl Price, OSC, project director since 1934, who retired at annual meeting.

Below: Electromode representatives at recent meeting in San Francisco. From left, D. C. Briden of Harry F. Haldeman Inc., southern California representative; T. B. Owen, Rochester, N.Y., sales manager; Clif Russell, northern California-western Nevada representative; F. W. Carlson, Seattle, Northwest representative; C. R. Ogsbury, Rochester, president of Electromode.

When the Northern California Chapter, International Association of Electrical Inspectors meets again, it will be guest of Karl W. Tober, Marin County electrical inspector, San Rafael. Tober (left); Ken Bliss, secretary, R. B. Maxwell, San Jose chairman, and V. O. Davis, San Mateo, at a recent Assn. meeting.



SHORTLY AFTER THE WAR ENDED, we announced a construction program which will provide 1,000,000 additional horsepower of electricity and expansion of natural gas distribution facilities to help build a greater California. This program will cost over $350,000,000 during a six-year period. Last year over $44,000,000 was spent on this program, and nearly $7,000,000 a month has been spent so far this year to press forward this vast construction and expansion throughout Northern and Central California.

When the program is completed in 1951 there will be available a total capacity of more than 3,500,000 electric horsepower for distribution to the homes, farms and factories in the area this Company serves.

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